


J1

2:H6

c.2

A HISTORY OF THE
NORTH CAROLINA
STATE BOARD OF HEALTH
1877-1925



Digitized by the Internet Archive
in 2010 with funding from
State Library of North Carolina

A
HISTORY
OF
THE NORTH CAROLINA
STATE BOARD OF HEALTH
1877-1925

NORTH CAROLINA STATE BOARD OF HEALTH
RALEIGH, NORTH CAROLINA
1966

THE FIRST FIFTY YEARS OF ORGANIZED
PUBLIC HEALTH WORK IN NORTH CAROLINA
A HISTORY OF THE STATE BOARD OF HEALTH - 1877-1925

BY
BENJAMIN E. WASHBURN

TO
ZILLAH HOWE WASHBURN

TABLE OF CONTENTS

	Page
Dedication	III
Foreword	V
Chapter I	
A Preliminary Report	1
Chapter II	
Formative Years 1877-1892	8
Chapter III	
Developmental Years 1892-1909	23
Chapter IV	
Years of Achievement	38
Resume	76
Appendices	78
A. Early Development of County Health Departments	79
B. The North Carolina Public Health Association	81
C. The North Carolina State Board of Health	87
D. Three Outstanding Organizers	93
E. Members of State Board of Health 1877-1964	97
Subject Index	99
Name Index	101

Foreword

The two main sources of information regarding public health work in North Carolina are the *Biennial Reports* of the State Board of Health and the *Transactions* of the State Medical Society. The *Biennial Reports* are made to each session of the General Assembly and transmitted through the Governor, while the *Transactions* are published yearly following the meetings of the State Medical Society. After its formation in 1911, the *Transactions* of the North Carolina Public Health Association were included, as a separate section, in the *Transactions* of the State Society. The history of the public health movement in the State is to a large extent the history of the State Board of Health and of the Medical Society.

This report of the public health movement in the State is given largely in chronological order, since its development paralleled advances in preventive medicine and was to a great extent dependent upon the action of the General Assembly in implementing measures suggested by the State Board of Health to make them apply to North Carolina. Because of this it seems sufficient to give only sources of information other than those found in the *Biennial Reports* and the *Transactions*, except for definite events about which sufficient data are not recorded in the text. Such data have been supplied by the following publications:

The Evolution and Significance of the Modern Public Health Campaign, by C. E. A. Winslow. Yale Press, 1923.

A Century of Public Health in Britain, by Harley Williams. A. & C. Black, London, 1932.

"The Formative Years of the North Carolina State Board of Health. 1877-1893", by Jane Zimmerman. *North Carolina Historical Review*, Vol. XXI, No. 1, January, 1944.

The Papers of Randolph A. Shotwell, edited by J. G. deR Hamilton, North Carolina Historical Commission, 1936.

The Health Bulletin, published monthly by the State Board of Health since 1886.

History of County Health Organizations in the United States, 1908 - 33, by John A. Ferrell and Pauline A. Mead. Government Printing Office, Washington, 1936

As I Recall, by B. E. Washburn; the Rockefeller Foundation, c1960.
The Story of the Rockefeller Foundation, by Raymond B. Fosdick;
Harper & Brothers, New York, c1952.
The University of North Carolina, 1900-1930, by Louis R. Wilson;
University Press, Chapel Hill, c1957.
Public Health Administration in North Carolina, by William A.
McIntosh and John F. Kendrick; 1940.
Public Health - Its Promise for the Future, by Wilson G. Smillie,
MacMillan, New York, 1955.

Among those who gave assistance in the preparation of this account of public health work in North Carolina, the most helpful have been Dr. W. P. Jacobs, of Chapel Hill; Dr. J. J. Wright, of the School of Public Health of the University; and Dr. D. F. Milam, of the State Board of Health. Without their constructive criticism, the story could not have been completed. Interviews with Dr. W. S. Rankin, of Charlotte, were especially informative.

To Mrs. Charles F. Gold, Jr. of Rutherfordton thanks are due for the loan of volumes of the *Transactions of the North Carolina Medical Society*; to the Library of the School of Public Health and the Louis R. Wilson Library of the University; and to the Library of the State Board of Health at Raleigh for supplying copies of the *Biennial Reports* of the Board of Health, as well as photostatic copies of early documents.

Acknowledgment should also be made of the help of Miss Ruth V. Hay of the School of Public Health; and to Miss Sara Chumley and Miss Jennifer Ruff, for stenographic assistance.

A Preliminary Report

At the closing exercises of the University of North Carolina in 1909, the commencement address was made by Dr. William H. Welch of Johns Hopkins University, his subject being "Preventive Medicine in its Relation to Society." In this address he outlined the progress made during the preceding fifty years in disease control, telling how leprosy, black death, smallpox, yellow fever, diphtheria and hydrophobia had yielded to preventive measures.

The year 1909 proved to be an eventful one in the history of public health of North Carolina. In that year, the General Assembly voted an increase in the annual appropriation of the State Board of Health, enabling it to employ a health officer for his full time. The State Board had been organized in 1877 and had been directed by two part-time secretaries who achieved remarkable success. During this formative period, the appropriations had been woefully inadequate, at times insufficient even to pay postage on the health literature they prepared and distributed. Under their direction, however, the North Carolina Board became recognized by health authorities throughout the nation; this is especially true of its organization which largely removed it from politics and stressed the importance of local (county) health organizations. The Board being appointed jointly by the governor of the State and the State Medical Society, had been able to influence the Legislature to enact measures

important to public health.

Also in 1909, John D. Rockefeller provided one million dollars to combat hookworm disease throughout the South. The newly organized Rockefeller Sanitary Commission, cooperating with the State Board of Health, began active work in North Carolina by conducting campaigns which by 1914 had reached all of the State's 100 counties. These county campaigns were far more successful in North Carolina than in other Southern states due to, in large measure, the cooperation of the people under the able direction of Dr. John A. Ferrell, State Director of the Hookworm Commission, and Dr. W. S. Rankin, State Health Officer.

The two secretaries of the State Board who conducted the pioneer health work so successfully were Dr. Thomas F. Wood from 1879 to 1892, and Dr. Richard H. Lewis from 1892 to 1909. A review of their activities is inspiring. During the early years the cause of contagious diseases was unknown and, with the exception of smallpox, their prevention was likewise unknown. The annual reports of the Board of Health to the State Medical Society and the *Biennial Reports* made to the General Assembly show the manner in which the Board kept abreast of the discoveries of bacteriology as applied to disease prevention and passed them on to the medical practitioners of the State. Also a review of the reports reflects the manner in which the people became educated regarding the source

of contagion instead of being environmental, the source of most infectious diseases was recognized to be the individual.

The first two secretaries, the reports show, were familiar with the advancement of public health in England and in other countries as well as in the United States: they kept in touch with the development of public health activities throughout the nation and the world and endeavored to apply them to similar conditions in North Carolina.

The recognition that disease prevention is the responsibility of society as a whole came to North Carolina in 1877 when its State Board of Health was created; however, protecting the public against disease dates from Biblical times. The isolation of lepers, considered the most important health measure, was at first carried out by the church. Many lepers were forbidden to mingle with the public, and early English churches had "leper windows" through which the unfortunate victims, assembled outside, could hear the services. Personal hygiene was brought to the attention of the public by the completion in 1775 of the voyage by Captain Cook, lasting more than three years with the loss of only one man from disease out of a crew of 118. This the Captain attributed to the provision of proper food which included lemons and oranges; to insistence on keeping the ship clean and dry; to fresh water; and ventilation of all quarters. Cook's accomplishment led to the demonstration by Drs. James Lind and Gilbert Blane in 1796 that scurvy can be prevented by the use of lemon juice.

In 1798 occurred one of the great events of preventive medicine — the discovery by Edward Jenner of a vaccine for the prevention of small-pox.*

Jenner's discovery was publicized in America by Dr. Benjamin Waterhouse, a professor at the Harvard Medical School, who, in July of 1800, vaccinated his five year old son with dried vaccine impregnated on a silk thread sent to him by Jenner. Thomas Jefferson aided Waterhouse and his colleagues in promoting vaccination. In 1806, Jefferson wrote Jenner in part; "Future nations will know by history only that the loathsome small-pox had existed and by you has been exterminated."

The industrial Revolution caused by the introduction of steamdriven machinery between 1767 and 1785 brought with it marked changes in the social and economic life of mankind. The resulting demand for labor in mills and factories brought about a system of apprenticeship in England which was little different from slavery. Pauper children were apprenticed in great numbers to factory owners; and the unfortunate children were often required to work 16 hours a day.* In 1802, reform measures were introduced which made for improved living conditions of such children and reduced their working hours from 16 to 12 hours per day. Then in 1847, Parliament passed a "Ten Hour Bill".

A great sanitary awakening came to England during the first half of the nineteenth century. As a result, a campaign was started for the protection of industrial workers. Two men, Sir Edward Chadwick (1800-1890) and Sir John Simon (1816-1904), were leaders in the movement and these two are, in a real sense, the fathers of modern health work.

**A Century of Public Health in Britain*, by Harley Williams, A. & C. Black, London, 1932.

*Ibid.

Chadwick was not a medical man but a lawyer and a student of social problems. In 1838, he was appointed Secretary of the Poor Law Commission. He became interested in the relationship between poverty and disease, and came to the conclusion that much disease could be prevented. This led him to employ a number of doctors to study unsanitary conditions which might lead to ill health. The resulting report was made by Dr. Southwood Smith, "On Some of the Physical Causes to which the Poor are Particularly Exposed and Which are Capable of Removal by Sanitary Regulations."*

In 1842, Chadwick published a report of his Poor Law Commission in three Volumes. This report entitled "Sanitary Conditions of the Laboring Population of Great Britain" was based on the studies made by the group of medical men appointed in 1838. This report produced a profound impression throughout England and, as a result, in 1843, a Royal Commission was appointed to report on the health of the large towns of the country. Also the report initiated a movement for the provision of water supplies and sewage disposal in England and America, as well as in other European countries.

In 1847, the town Council of Liverpool appointed Dr. W. H. Duncan to be Medical Officer of Health, this being the first city health officer in England. The next year the City of London Corporation created a similar post and elected Dr. John Simon to be Medical Officer of Health. Among other duties he was directed "to inspect and report periodically on the sanitary condition of the city, to ascertain the existence of diseases, more especially epidemics — and to point out any nuisance or other local causes which are likely to originate

and maintain such diseases and injuriously effect the health of the inhabitants of the city." Included in his duties were the securing of proper ventilation of churches, schools, lodging houses and public buildings. He was directed to perform any other duties of a like nature.

Simon attacked these problems with enthusiasm. He made a review of death certificates, making inquiries as to the circumstances attending each sickness and death, and took measures to clean up the area under his care. His reports were circulated through the daily press and "were received by the public with every possible indulgence and favour." His book entitled *English Sanitary Institutions* gives details of the methods by which he obtained such marked results.

In 1855, after being Medical Officer of Health of London for seven years, he became head of the newly created General Board of Health, a position he held for twenty-one years during which he secured legislation in many fields of public health. He arranged for local authorities to have the power to suppress nuisances and provide necessary public health work. He gave attention to child health; to labor conditions existing between employees and employers; to restrictions on the sale of poisons; to adulterated foods and drinks and medicines; to the provision of public water supplies; and to the sale of meat unfit for human food.

In epidemics Simon organized medical assistance and provided vaccination for everyone free of cost. Through education he exerted

**The Evolution and Significance of the Modern Public Health Campaign*, by C. E. A. Winslow, Yale Press, 1923.

great influence on public opinion; he tried especially to educate the better classes, whom he states had not "reached any high standard of sensibility to dirt." In a word,

Simon's work was largely concerned with remedying the evils of chronic filth which favor the spread of epidemics.

THE PUBLIC HEALTH MOVEMENT IN THE UNITED STATES

In the United States, the movement for public health began in 1850 when the "Report of the Massachusetts Sanitary Commission" was published. This report by Lemuel Shattuck was inspired by the work of Chadwick and Simon and their achievements in England and is one of the most remarkable documents in the history of public health. Shattuck, like Chadwick, was not a medical man but was a statistician and a student of social problems. An important part of his report, "A Plan for A Sanitary Survey of the State" outlined a complete health program and recommended the establishment of a system of sanitary police, consisting of state and local health departments. The full scope of his suggested plan can best be recognized by a list of the items recommended. Along with careful collection of vital statistics, the plan included: the sanitation of towns and of buildings; the formation of sanitary authorities for spreading information regarding sanitary measures; the health of school children; special investigation of causes and prevention of tuberculosis; control of alcoholism; supervision of mental cases; the creation of model tenements, public baths, and wash houses; control of the smoke nuisance; food adulteration; better education of nurses; routine physical examinations; and the preaching of health in churches and schools.*

It is interesting to note that the recommendations of Shattuck have,

during more than a century, been the common practice of modern health departments. Shattuck was much ahead of his time, but his ideas lead in 1869 to the establishment of the first State Board of Health in the nation. Following the establishment of the Massachusetts Board, other states quickly became interested and nine years later there were sixteen other boards in existence.

Interest also developed for municipal health departments. A sanitary survey of New York City, based on the report of Shattuck, caused the formation of a Citizens Association in 1864, under the leadership of Peter Cooper. This, however, failed to secure the local health service it advocated, but it led to a second sanitary survey, this time under the direction of Dr. Stephen Smith, who later became the first President of the American Public Health Association. Dr. Smith died at the age of 99 in 1922, his span of life covering the great strides made in public health work throughout the nation and the world.

This survey by Dr. Smith became a political issue and in 1866 led to the passage of the Metropolitan Health Law which formed the basis for the comprehensive powers later conferred upon departments of health throughout the United States.

**Public Health - Its Promise for the Future*, by Wilson G. Smillie, Macmillan, New York, 1955.

The discoveries of Pasteur and Koch and other European scientists were brought to the United States by Surgeon George M. Sternburg of the Army in Washington, and by Dr. William H. Welch at the Johns Hopkins University. The Massachusetts State Board of Health was reorganized in 1886, with the purpose of developing special control over "the purity of inland waters." Cooperation between the Massachusetts Board and the Massachusetts Institute of Technology led to the establishment of modern methods of sewage treatment; and later to the earliest training school for sanitarians in the United States. This was followed by a State Laboratory of Hygiene in Michigan in 1887; and the first municipal public health laboratory was opened in Providence, Rhode Island in 1888. In all three places emphasis was chiefly on the sanitary rather than the medical aspects of water purification and sewage treatment.

The great epidemic of cholera in Hamburg in 1892 made apparent the importance of bacteriology in the control of communicable diseases. This epidemic led to the quarantine of ships coming to New York. Dr. Herman M. Biggs, Pathologist to the City Health Department, showed that bacteriological methods for the detection of cholera cases were feasible and an effective Division of Bacteriology and Disinfection was established. Dr. W. H. Park, of the staff of the City Laboratory, in 1892 introduced a new technique for the bacteriological diagnosis of diphtheria; and in 1894 an appropriation was obtained for the manufacture of diphtheria antitoxin, at that time produced only in Germany and France.

The two decades from 1890 to 1910 have been called the "Golden Age of Public Health." During this period, the germ theory of the cause of disease was thoroughly es-

tablished and the science of bacteriology made precise and definite the facts about the spread of disease and the dangers arising from lack of sanitation. The old theory that the cause of disease lay in man's environment gave way to the knowledge that the cause is in man himself. Three great groups of diseases — those spread by water, by insects, and by direct contact — became recognized to be the source of the more common contagions.

The old beliefs that "running water purifies itself" and that water which looks good and tastes fresh is likely to be safe were dropped and attention turned to securing safe water supplies for towns as well as for individual homes. Filtration, which at first was used to improve the appearance of water, became recognized as a means of removing bacteria as well as visible impurities.*

The value of filtration had been demonstrated in the cholera epidemic in Hamburg in 1892. And following epidemics of typhoid in Lowell and Lawrence, Massachusetts, the latter town installed a filtration plant in 1893; Albany followed in 1899. These filters were slow-sand filters. In a short time, however, rapid mechanical filters came into use; in these, effective filtering was increased by the addition of a chemical coagulant. This type of filtration soon became standard, until in 1903 the chemical method of water purification by the use of hypochlorite of lime came into use. Later this was replaced by liquid chlorine.

Knowledge regarding insect-borne diseases became more general with the acceptance of the germ theory; malaria is an example. In spite of many facts in regard to this

*Winslow, Chapter IV, page 34.

(bad air) disease, the cause was thought to be a poison found in the soil and was brought out by turning moist earth, as in the plowing of marshy ground; also it was spread when the water level is lowered and the moist soil is exposed. The miasma arising from these sources might be carried long distances by the wind. One theory and the one at first accepted by the Secretary of the North Carolina Board of Health was that the cause, after generating in the soil, might be carried in water from streams arising in marshy districts.

In 1898, two Italian doctors, Grassi and Bignami, identified the germ of malaria in the anopheles mosquito. This followed the demonstration a year earlier by Ronald Ross of the parasites of bird malaria in mosquitos. The mystery of drifting miasma from moist sources was solved with the recognition that mosquitos are the real carriers.

In 1900 came the conquest of yellow fever. This scourge had appeared in the United States at least thirty-five times during the nineteenth century; and up until 1879 had occurred every year except two. In 1793, one-tenth of the population of Philadelphia is said to have died from the disease. The cause was shrouded in mystery.

In 1900 a commission of army officers, headed by Dr. Walter Reed, made a study of the disease in Havana. The experiments carried out by this Yellow Fever Commission proved beyond doubt that the disease is transmitted by a mosquito, the *Aedes aegypti* and in no other way.

The practical results of this experiment were immediate. In the city of Havana, with an average of 750 deaths a year, following a clean-up campaign in 1901, there were only six deaths. And as is well known, yellow fever control made it

possible to build the Panama Canal. The last epidemic of yellow fever to occur in the United States took place in New Orleans in 1905. Control measures were carried out by Dr. Henry W. Carter of the Public Health Service. Dr. Carter later did malaria control work in North Carolina.

The eradication of communicable diseases spread by water and by insects soon became a problem of economics and administration in the United States. Progress in the control of the contact-borne diseases was slower — even at present exact knowledge of the cause and method of spread of some diseases has not been determined. It has been proved that the germs causing certain diseases can adapt themselves to their human host, in fact, some have lost their ability to maintain themselves outside their host, dying when away from the favorable conditions of the human body.

The spread of contagion by air, dust, and fomites soon became recognized as unlikely; the important factor being the transfer of infected material from one person to another. Another fact emerged: the human source of infection need not be direct contact with a person actually sick with the disease. Many diseases, typhoid and diphtheria are examples, can be transmitted by carriers. This fact brought about the development of epidemiology by which the sources of infectious diseases are located.

Another important factor in the development of public health practice came in 1910 when Dr. Charles V. Chapin, Health Officer of Providence, Rhode Island, published, "The Sources and Modes of Infection." In this book were presented new facts which led to the abandonment of fumigation of rooms and houses following an infectious disease. Instead, stress came to be

placed upon a search for carriers, quarantine and a prompt isolation of early cases.

The next step in the prevention of infections was by vaccination which built up artificial or passive immunity. The discovery of vaccination by Jenner brought out this concept. Progress in this measure lay in the studies of Pasteur on anthrax and later in the protection against rabies by the use of an attenuated type of the infected source of the disease. This resulted in studies in immunity and how to produce it; accomplished for cholera by Haffkine in 1895, typhoid in 1896 by F. F. Russell of the United States Army, and plague by Haffkine in 1906. Passive immunity created by the injection of serum from an animal previously made immune led to the discovery of diphtheria antitoxin by Behring and Kitasato in 1890; and the discovery of vaccines and antitoxins for the prevention and treatment of infection is still progressing.

Of these discoveries, the most important, certainly for North Carolina, are those relating to the prevention of typhoid fever, smallpox, and diphtheria. These diseases have been completely controlled in many places and vaccines and serums have been introduced in pneumonia and cerebro-spinal meningitis; and tests have been created by which immunity against diphtheria can be determined.

The history of public health is reflected in the progress of disease prevention carried out in North Carolina under the direction of the State Board of Health. At the time of the Board's organization in 1877, disease prevention was sought largely through improvement of the environment; but advances in medicine as they applied to the control of infectious diseases were readily adopted. With this came the importance not only of clean surroundings but especially the provision of safe drinking water and sewage disposal by towns and cities. From its beginning, the Board recognized the need for vital statistics as a means of measuring progress. The inspection of state schools and institutions was carried out as well as the inspection of prisons and mental hospitals.

Educational work consisted of lectures, health conventions in the larger towns, the publication of a monthly health bulletin, and pamphlets on disease prevention. To a large measure it appears that the Board may have taken Shattuck's report and item by item carried out the measures thought to be applicable to the State. The able administration of the North Carolina Board of Health during its formative years which led to the provision of a full-time State Health Officer in 1909, later led to the development of a system of public health work designed to meet the needs of the State.

Formative Years, 1877-1892

The need for a state board of health to conduct organized work against the spread of disease was early recognized by the North Carolina Medical Society. This Society was organized in 1800 following a preliminary meeting of doctors held in Raleigh in December of 1799. There are records of meetings, all held in Raleigh during 1800 to 1804; then no further meetings were held until the Society was reorganized in 1849, with 25 doctors in attendance at Raleigh. At this meeting, Dr. F. J. Hall was elected President and Dr. W. H. McKee, Secretary. The first annual meeting of the reorganized society was held the following year when Dr. Edmund Strudwick was elected President. Except for the years 1861 to 1865, during the Civil War when the Society was suspended, regular annual meetings have been held since 1850. As the Society became more and more representative of the profession throughout the State, attendance at annual meetings increased regularly. Up to 1860 the largest attendance was 81 at the meeting held in Statesville; the largest attendance since was 1,077 at the Pinehurst meeting in 1954.

The Society took the initiative in improving the standard of medical service by inaugurating a movement to require educational standards before a doctor could engage in practice. The State Legislature was influenced at its 1859 session to make it a requirement that a doctor pass a Board of Medical Examiners before being allowed to practice. Of course those already in practice before 1859 were not affected by the law. The enforcement of the law has resulted in a relatively high

standard of medical practice in North Carolina.

Immediately following the Civil War, the State Medical Society discussed the need of a state board of health and advocated its provision. In this, the Society had the support of leading citizens throughout the State who had seen the terrible conditions brought about during the War due to the lack of organized health work and sanitation. In 1862, an epidemic of yellow fever occurred in Wilmington which "ragged with terrific effect for two or three months". One of the victims of this epidemic was Dr. James H. Dickson, a prominent member of the State Medical Society who had been President of the Society in 1854-55. His death greatly affected his colleagues and increased the realization that some steps should be taken to prevent or at least lessen the ravages of yellow fever, smallpox, typhoid, and other death-dealing contagions. At the first annual meeting of the State Medical Society following the War, the problem of preventing disease was discussed at great length.

During the war the movement of troops through the State had caused many diseases to spread, the more deadly and terrifying being typhoid and smallpox. Also, North Carolina had been invaded by Federal troops and this caused smallpox and other diseases to become more widespread. And following the war, the problems of health and sanitation were made worse by the return of soldiers from the Confederate Army. Added to this a great number of recently freed Negroes flocked into towns as a result of the rumor that each was to be given "forty acres

of land and a mule'' * Smallpox became scattered to all parts of the State and in 1866 reached epidemic proportions in many counties.

The most serious epidemic began in Wilmington in October of 1865. A city smallpox hospital was founded and during nine months 761 cases were admitted, most of them being Negroes. Among the doctors in Wilmington at this time was Dr. Thomas Fanning Wood who had only recently returned from service in the Confederate Army. The epidemic became so intense that he opened a hospital for sick and indigent Negroes where more than 1300 were cared for. His work with the poor and helpless, following his army experience, caused Dr. Wood to realize the need of public health work to prevent such epidemics not only in Wilmington but throughout the State.

Before the war, Dr. Thomas F. Wood, a native of Wilmington, had worked in local drug stores where, through filling prescriptions for local doctors, he learned a great deal about drugs. This experience led to the study of botany, and he became an authority on the flora of Eastern North Carolina. Because of this, he was later made a member of the Committee for the Revision of the "United States Pharmacopeia".

Dr. Wood decided to become a doctor himself and studied under a leading practitioner of the town as was the custom at that time. With the coming of the War, he volunteered his services as a private in the Eighteenth Regiment of North Carolina Infantry. Because of his early training, he was made a hospital attendant in the North Carolina Hospital in Richmond. During this period, he was given permission by the Secretary of War to attend lectures at the Medical College of Virginia during his off-duty periods. He was successful with his studies and passed the medical exami-

nations and as a result, in February of 1863, he was appointed an Assistant Surgeon and assigned to the Third Regiment, North Carolina Infantry. He was with Lee's Army at Appomattox on April 9, 1865. At the end of the War, he returned to Wilmington and began the practice of medicine.

The experience of Dr. Wood in the Army and his practice in Wilmington, especially his work during the smallpox epidemic, caused him to endeavor to bring about some means of preventing epidemics or at least of lessening their deadly effects on people who are not able to protect themselves. He gained the support of the leading practitioners of Wilmington, and through the *North Carolina Medical Journal* which he, with Dr. Moses John DeRosset, edited, carried his vision to the State Medical Society and through its members to the State as a whole. The interest Dr. Wood created caused the Society, on May 16, 1872, at a meeting held in New Bern, to discuss the possibility of establishing a state board of health. A committee was appointed to suggest subjects deserving legislative action. This committee proposed to "solicit at the hands of the Legislature the passage of an act providing for a Board of Public Charities, etc., so as to make such a Board not one of charity alone having supervision as now over the penal and charitable institutions of the State, but one of health and vital statistics; also embracing in its scope of duties, investigations of the causes affecting the health and lives of the people."

At the general meeting of the Society, the proposal brought on much discussion as to the wisdom

**The Papers of Randolph A. Shotwell*, edited by J. G. deR. Hamilton, North Carolina Historical Commission, 1936, Vol. II, p. 254.

of sending a committee to the General Assembly. Opposition to this was led by Dr. Charles O'Hagan of Greenville who declared that it would be useless, since the task of presenting the needs of the people was the duty of the press and the pulpit. Also, he stated his opposition on the grounds that it would make martyrs of such a committee by sending the members as a body to beg from the General Assembly. Dr. O'Hagan's views were accepted by a majority of the members present, and a committee of lobbyists was not nominated to go to Raleigh.

The Eastern Medical Association, composed of a group of doctors residing in counties near or bordering on the coast, met in Wilmington in December of 1875. The main group of Wilmington doctors, no doubt led by Dr. Wood, decided to renew the fight for a state board of health. To be successful, it was necessary to have the support of the State Medical Society in presenting the matter to the General Assembly. In the undertaking of arousing the interest of the members of the State Society, the group of Wilmington doctors took the lead.

In February, 1875, they had presented to the General Assembly a bill providing for the appointment of a superintendent of health for Wilmington, and along with this bill was sent a petition expressing the need of a medical officer to look after the sanitary conditions of the city and to secure the adoption of suitable health requirements which it would be his duty to enforce. Eleven physicians of Wilmington were among those who signed the bill which was presented to an approved by the General Assembly.

At the next annual meeting of the State Medical Society, held in Fayetteville, a paper was read by Dr. S. S. Satchwell of Rocky Point on "State Medicine and Preventable

Diseases." This paper was described in the minutes as "a clear, forceful argument in favor of the establishment of a State Board of Health," and created great interest among all members for the provision of some system of public health for the State. A committee was appointed to place the matter before the Legislature; the members of the committee were Drs. S. S. Satchwell of Pender County; R. L. Payne of Davidson County; Marcellus Whitehead of Rowan County; and George A. Foote of Warren County. The committee went to Raleigh in 1877 for the meeting of the General Assembly and remained there for most of the session, being joined by Drs. Eugene Grisson and M. J. Pittman. These doctors were successful in securing the passage on February 12, 1877 of a bill to establish the North Carolina State Board of Health.

The Board of Health, as established by the General Assembly, was to consist of all the members of the State Medical Society who were to be the medical advisers of the State and as such give advice to the government "in regard to the location and sanitary management of public institutions." They were to call the attention of the State to such sanitary matters as, in their judgment, affected "the industry, prosperity, health, and lives of the citizens of the State." And finally, they were to make to each regular session of the General Assembly, through the governor, a report of their work, investigations, and discoveries together with suggestions for further legislative action which they believed to be necessary. An annual appropriation of \$100 was made to meet the expenses of the Board. No provision was made for printing, but the *Biennial Reports* of the Board would be published as state papers coming from the governor.

The Legislature also recognized the need for local health organizations and a further "Act to Establish Boards of Health in the State of North Carolina" specified that county medical societies should constitute county boards of health and cooperate with the State Board in carrying out public health measures. The county boards were to look to the legal advisers and authorities of the county and incorporated towns for their executive duties and powers and to act with these authorities in drawing up rules and regulations that the two parties might deem expedient.

The organization of the State Board of Health was effected at the following annual meeting of the State Medical Society held at Salem on May 23, 1877. Dr. S. S. Satchwell was elected President and Dr. Thomas F. Wood, Secretary and Treasurer. A committee was appointed to frame by-laws and make regulations for the operation of the Board. This committee recommended that the duties imposed upon the State Medical Society by the Act be carried out by an executive committee appointed by the medical society, which would make a report to the governor at the next meeting of the General Assembly. This committee consisted of Drs. S. S. Satchwell, Thomas F. Wood, Charles Duffy, Jr., Peter E. Hines, and George A. Foote.

The annual appropriation of \$100 made by the Legislature was ordered to be paid to the Treasurer of the State Medical Society, subject to the order of the Treasurer of the Executive Committee of the State Board of Health.

The act, as passed by the Legislature of 1877, was a disappointment to those of the State Medical Society who had worked for the establishment of a State Board of Health; but it was accepted as a beginning

toward a more effective board of health. Dr. Wood expressed this when he wrote that the act was considered by the great majority of the members of the Society as an insult to the intelligence of that body. Yet, he said, "Some of the members were willing to undertake it with no more money from the State than enough to pay the stationary bills. A great deal of work has been attempted with a view of organizing for the future when the Legislature will have learned wisdom enough to make an appropriation adequate to the necessities of the case."*

Dr. Satchwell, in an address entitled "Board of Health," stated his belief that the appropriation was small because the state treasury was in a depleted condition. He believed, however, if the society was careful in carrying out its required duties and elected competent persons to assist in this work, each successive legislature would increase the appropriation. With adequate funds, the State could have a useful department of health with, perhaps, a full time health officer.

Interest in the newly-created Board of Health was not limited to members of the State Medical Society. The state press expressed public sentiment favorable to the Board. The *Wilmington Weekly Star* invited the special attention of physicians, legislators, and others interested in vital statistics to the work of the Board. The *Star* also referred to the parsimony of the Legislature in appropriating only \$100 for work of such vital importance. It states: "We believe that an appropriation of \$2000 would not

*"Sketch of the Medical Society of North Carolina," by Dr. Thomas F. Wood, Quoted by Jane Zimmerman in "The Formative Years of the North Carolina Board of Health," in *North Carolina Historical Review*, January 1944.

have been more than enough to carry out successfully and efficiently the very important end in view."

As may have been anticipated, the work of the Board of Health, as set up by the Act of 1877, was inefficient and unsatisfactory. The State Medical Society at that time consisted of about 150 members from 94 counties, and there was no definite organization. With this situation, the Board had indeed only nominal existence. The appropriation of \$100 was not even adequate to enable the Secretary to keep in correspondence with members of the Society. Nevertheless, Dr. Wood sent out an average of about 200 letters per month in an attempt to reach all parts of the State and bring about some semblance of organization. He realized the inadequacy of the Board as it was established, but he was hopeful that the next General Assembly would so improve the legislative provision as to enable the Board to carry on effective programs which should improve the health of the people. In June of 1878 in the *North Carolina Medical Journal*, he made an appeal for further legislative action, ending with the injunction to "vitalize your already existing Board of Health or wipe it off the Statute Books!"

The efforts of Dr. Wood served to maintain the interest of the State Medical Society and a committee from the Society met in Raleigh on January 20, 1879 at the opening of the General Assembly. This committee prepared a bill for presentation which would change the organization and function of the Board. This bill, although an improvement over present conditions, was in fact no more than a compromise measure drawn with such provisions as the committee thought might be passed by the General Assembly. They believed that if more were asked, it might mean the defeat of the entire undertaking.

The bill proposed by the committee from the Medical Society was sent to Governor Zebulon Baird Vance, who gave it his personal approval. The Governor sent the bill, which was incorporated in the "Report of the Secretary of the State Board of Health of North Carolina," to the General Assembly with the following communication: "I commend it and the suggestions it contains to your careful attention. The great importance of the subject and the eminent source from which the report emanates claim an earnest degree of your consideration."

In spite of the approval of Governor Vance, the bill was drastically changed and many amendments made in both the House and the Senate. However, on March 14, 1879, the "Act Supplemental to an Act Creating the State Board of Health" passed both houses; and the Board thus created has functioned ever since with, of course, many modifications and changes.

Under provisions of the new act, the Board of Health was to be made up of nine members. Six of these were to be chosen by the State Medical Society from its active members and three to be appointed by the governor. It was specified that one of the members appointed by the governor was to be a civil engineer.*

The members appointed by the Medical Society were to serve two for six years, two for four years, and two for two years; while those appointed by the governor would serve for only two years. All vacancies were to be filled by the Board of Health. The officers of the Board were to consist of a president and a secretary-treasurer. The latter was to be paid for his services, the amount to be fixed by the Board.

**Laws of North Carolina*, 1879, p. 219.

The general duties of this new board included all the items named in the 1877 act, these being included in the "Supplemental Act of 1879." In addition, provision was made for the publication of bulletins whenever there occurred an outbreak of disease in epidemic proportions, the object being to inform the public on how to prevent and stop the spread of dangerous diseases. Chemical examination and analyses of water were to be carried out; and auxiliary boards of health were to be organized in each of the 94 counties of the State. These county boards were to be composed of all the practicing physicians of the county, the mayor of the county town, the chairman of the board of county commissioners, and the city or county surveyor. This board was to select a doctor who would serve for two years as county superintendent of health.

The new health law provided for a program of disease control which included quarantine, abatement of nuisances, and vaccination. The problem of quarantine was placed in the hand of the county board, the superintendent of health being responsible for the confinement and isolation of cases of smallpox, yellow fever, scarlet fever and other diseases "dangerous to the public health." Should the superintendent of health fail to carry out these duties, he could be fined \$25 or imprisoned in the county jail. This is the first instance of compulsion for infraction of health laws in the State.

As to nuisances, those considered "dangerous to the public health" were to be abated by the parties occupying the premises on which the nuisances occurred in accordance with regulations prescribed by the county superintendent of health. Failure to give notice of a nuisance or failure to carry out the instructions of the superintendent

was a misdemeanor and subject to a fine or imprisonment.

As to vaccination to prevent smallpox, as set forth in the law, the superintendent of health was to be assisted by the Secretary of the State Board of Health who was required to keep on hand a supply of fresh smallpox vaccine to be sent to the county superintendents whenever there was a threatened outbreak. The county superintendent was required to vaccinate free of charge all persons applying for such service and, in addition, all persons admitted to jails or poorhouses, and public school children.

Aside from vaccination, a number of important duties were assigned to the county superintendent of health. Among these were the gathering and registering of vital statistics and performing post-mortem medical examinations for coroners. In addition, he was to carry out all the duties suggested by the State Board. For his services the county superintendent was not given any stated salary but was to receive the amount paid by the county in 1878 for medical attendance on the jail and poorhouse, plus amount paid by the court for his medico-legal examinations. A serious drawback was the fact that in some counties a very small amount, and in others nothing at all, had been expended for these services. The State Board of Health was voted an annual appropriation of \$200 to carry out these numerous items.

Under the provision specified in the act, the organization of the State Board of Health took place on May 21, 1879 just a few weeks after the act had been passed by the General Assembly. The State Medical Society elected the following doctors to serve on the Board: Dr. S. S. Satchwell of Rocky Point to serve six years; Dr. Thomas F. Wood, Wilmington, to serve six

years; Dr. Charles J. O'Hagan, Greenville, for four years; Dr. George A. Foote, Warrenton, for four years; Dr. M. Whitehead, Salisbury, for two years; Dr. R. L. Payne, Lexington, for two years. The governor, on the part of the State, appointed Dr. A. R. Ledoux, Ph. D., Professor of Chemistry at the University of North Carolina; William Cain, Civil Engineer, Charlotte; and Henry G. Woodfin, M. D. of Franklin. Dr. Satchwell was re-elected President of the State Board of Health; and Dr. Wood was made Secretary-Treasurer.

At the initial meeting, a resolution, introduced by Dr. A. R. Ledoux and adopted, entrusted to the Secretary the carrying out of the details of the provisions specified in the act and directed him to make his report to the next meeting of the Board. Dr. Ledoux also made a resolution which was adopted to appoint a committee to confer with the Department of Agriculture and make arrangements for chemical investigations and other examinations required by the Board. It was also proposed by Dr. Ledoux that the Secretary be entrusted to work out and to execute the details of the legislative provisions. This was also accepted, and Dr. Wood, as Secretary, became virtually the "Board of Health."

Dr. Wood began at once to make the Board of Health a vital influence in the life of the State. His greatest handicap was lack of funds. He had great faith in the outcome of the Board, however, as is evidenced by the fact that in the biennium 1879 to 1880 he spent \$831.99 instead of the \$400.00 appropriation, the extra \$431.99 being from his own private funds.

The first subject to be considered was the organization of county boards of health. A circular was sent to county commissioners

calling their attention to the law passed by the 1879 General Assembly and to the creation of the State Board of Health. It was suggested that the chairman of the board of commissioners call together the following; the physicians who had been licensed by the State Board of Medical Examiners, the mayors of the county towns, and the city and county surveyors, and have them elect from the physicians comprising the board a suitable person to become superintendent of health.

The organization of county boards was proceeded with in fifty counties by September, 1879. Also, during 1879, frequent letters of inquiry were received from other counties asking about methods of organization. This led to the issuing of a circular answering most of the questions asked. The fact that fifty counties readily organized boards of health and inquiries from other counties in regard to carrying out the details of the act was evidence of the widespread interest in public health in the more important counties of the State.

The handicap to the success of the program was lack of funds. In the organization of county boards of health, the superintendent was to be not only an adviser to the board, but, in addition, the law specified that he "shall gather vital statistics upon a plan designated by the State Board of Health. He shall make medico-legal post-mortem examinations for coroner's inquests, and attend prisoners in jails, poor-houses and workhouses. His report shall be made regularly as advised by the State Board of Health through their secretary, and he shall carry out so far as is practical such work as may be directed by the State Board of Health."

A form was issued with instructions for making the monthly report. Among the multiplicity of

items asked for were reports on the population of the counties and the towns, with the sanitary conditions of each; prevailing winds, rainy or snowy days, average temperatures; preventable diseases, the number of cases of smallpox, measles, diphtheria, whooping cough, scarlet fever and cholera being especially named; diseases among domestic animals; condition of public buildings — the jail and poorhouse; number of successful smallpox vaccinations; and finally, the efforts being made to improve the sanitary conditions of the towns of the county.

With so many duties specified by the law, few doctors were willing or could afford to undertake such a position, especially since the pay was small and often uncertain. In fact, the law gave the superintendent such amount as was expended in 1879 for his services and as has been noted, in some cases, this was nothing at all. Doctors who accepted at first did so for patriotic reasons and because of the interest they had in this undertaking which had been inaugurated by the State Medical Society.

During the first biennium, the State Board issued a number of pamphlets; these were received with favor by the people. Among the most important was a pamphlet entitled, "Disinfection, Drainage, Drinking Water, and Disinfectants," by Professor William Cain of the University of North Carolina, a member of the Board. In June, 1879, this publication created so much interest that Professor Cain was asked to prepare a paper elaborating the topic. This was issued in a pamphlet entitled "Sanitary Engineering." So many demands were received for Professor Cain's treatise that he prepared a more elaborate work under the same title. A large edition was printed but was exhausted within a few months of its publication.

This pamphlet created much interest throughout the State; especially the section on drinking water. As a result, Dr. A. R. Ledoux, Chemist of the State Experiment Station, undertook to make such analyses of drinking water as were approved by the State Board of Health. A form was designed for sending in samples.

In the autumn of 1879, diphtheria became prevalent in many counties and Dr. R. E. Payne prepared, at the request of the Secretary, a pamphlet on the "Limitation and Prevention of Diphtheria."

The Secretary, in a statement given to the press on the subject of vital statistics, called attention to the fact that knowledge of prevailing diseases is necessary in pointing out defective sanitary conditions. Also, it is essential to the success of the endeavors of the State in securing immigration of "Those likely to seek homes in America." The State Board of Agriculture was asked to collect vital statistics, but it was decided that money could not be diverted from its specific use without authorization. The State Board of Health then undertook the work alone. In collecting vital statistics the Board was handicapped by lack of cooperation of doctors to make reports to the county superintendents of health.

It is interesting to review the pamphlets issued by the State Board, and included as an appendix to the first *Biennial Report*, since they give an insight into the accepted beliefs regarding health and disease of the period. The circular on "Ventilation, Drainage, and Drinking Water" states that "soil soakage" may be the cause of diphtheria and typhoid fever; also, of malaria although this is found mostly in alluvial, tidewater districts. The pamphlet points out that "some persons" believe that fruits ripening

may cause disease. Scuppernong grapes should be avoided. On the other hand, it states that many physicians say that "fruit and fish are safe." The sprinkling of unslaked lime is recommended as of "prime necessity to keep the air of the house pure." Ditches should not be opened or the soil disturbed during August and September. A good rule is not to disturb the soil between June and November. This should certainly be observed where there has ever been an epidemic of yellow fever.

Professor Cain's treatise states under "General Conditions": Typhoid, diphtheria, certain enteric fevers are common in North Carolina due to "bad wells, foul yards, privies and cesspools tainting the air with their gasses." He states that the average mortality in the United States is about 20, ranging from 17 to 30 per thousand. St. Louis, on the other hand, showed the rate of only 11, which "must be associated largely to the excellent water supply and sewage system."

"Whether we accept the germ theory or not," Professor Cain asserts, "it is admitted that drinking foul water and breathing impure air debilitate the system and thus render it less able to withstand epidemics. Let us then follow the natural instincts and avoid polluted air and water, especially as North Carolina can afford the pure articles in such abundance."

Despite Dr. Wood's appeal to the Legislature which met in 1881, the General Assembly did nothing to change the organization of the State Board of Health. The State Board in both 1881 and 1883 prepared bills to make revisions which would bring about more effective control of infections and the collection of vital statistics. On both occasions, these bills failed to pass the General Assembly; however, in 1881, a law

was passed requiring the registration of vital statistics at the annual listing of property for tax purposes. This law proved to be ineffectual since the reporting was upon a voluntary basis; and, in spite of the appeal for more funds, the annual appropriation for the Board remained at \$200.

Naturally, the State Medical Society was disappointed by this lack of interest in the health work of the State, and it continued its campaign for a more efficient State Board of Health. Dr. Wood, Secretary of the Board, was President of the State Medical Society in 1882 when the annual meeting was held in Concord. At this meeting, a committee of one doctor was named in each county to "canvass (the people) in the interest of prospective legislation on public health matters." But again, in the session of 1883, no further assistance was given the State Board of Health.

Dr. Wood's report made at the conjoint session of the State Board of Health and the State Medical Society held in Raleigh in 1883 was very pessimistic. He said, "During the year little more has been done than to issue pamphlets on the subject of city sanitation." He pointed out that it was impossible to inaugurate public health work, to say nothing of carrying it on, without some money at least. He also pointed out that the measly \$200 a year handed out by the legislature was totally inadequate and added that the object of the Board seemed to be in retrograde condition in North Carolina; while in other Southern states they went forward in the opposite direction. He expressed his opinion that a crisis was imminent in the history of the Board.

In 1883, Dr. J. W. Jones of Wake Forest, was elected to membership on the State Board. He soon became an "active promoter of sanitary

work." Due to his efforts, a resolution was introduced requesting all county superintendents of health and members of local school boards to come to Raleigh at the opening session of the Legislature. The purpose of this proposed meeting was to urge changes in the health laws to make the work of the State Board of Health more effective, the enactment of vital statistics legislation, and to provide more adequate funds with which to carry on the work of the Board. After much discussion, a resolution was passed directing the President to appoint a committee to present these needs to the Legislature.

The members of the 1885 Legislature were evidently impressed by the efforts being made by the State Medical Society, especially since the people of the State were showing interest in the matter. The General Assembly amended the laws so as to make the county boards more efficient; the annual appropriation was increased from \$200 to \$2000; and a contingent fund of \$2000 was set up to be expended with the approval of the governor whenever an epidemic occurred; also, printing privileges not to exceed \$250 annually were extended to the Board.

As a result of the increased appropriation and the added printing privilege, the Board began the publication of a health bulletin, this being the first publication of this nature in the United States; also, there was published a pamphlet on "Care of the Eyes" by Dr. Richard H. Lewis. This pamphlet was well received and the edition was soon exhausted. To meet further demands for it, the next Legislature provided for the printing of 10,000 copies for free distribution. This brought recognition by the Board that health education is the most important phase of public health service. From the beginning, the Board had issued pamphlets on various diseases and

their prevention. This began during the first year of the Board's existence in 1878 with the publication of "Timely Aid for the Drowning and Suffocating." Other pamphlets were "Advice from the North Carolina Board of Health of the Necessity of Vaccination"; "The Test of Genuine Vaccination"; "The Quality of Vaccine"; and a "Guide to Shipowners Entering the Cape Fear River."

The first issue of the monthly *Health Bulletin* appeared in April, 1886 and contained reports from 26 counties, with tables made up from the reports of county superintendents of health giving the conditions of weather, the prevailing diseases, epidemics, diseases of domestic animals and the condition of public institutions, especially of the jails and poorhouses. The reports of the latter included, among other things, the number of inmates, the number who had been successfully vaccinated, the kind and the amount of food, the number who could read and write, and a report of general sanitary conditions existing in the county. Along with these reports were additional articles and editorials to instruct the people in hygienic matters.

The *Bulletin* was widely distributed; being sent to state and county officials, public libraries and to all members of the State Medical Society, to mayors and health officers of cities and towns, and to any citizens who asked for it. It was intended to be, and was, the voice of the State Board of Health. Commenting on the first issue of the *Bulletin*, Dr. Jones, President of the Board, said to the North Carolina Medical Society at its meeting in 1886: "It will go out as a monthly messenger of glad tidings with healing in its wings, with words of truth and notes of cheer, or sounds of alarm if danger comes nigh." During its early years,

the *Bulletin* was prepared largely by Dr. Wood who alone decided what should be printed. Also, the wrapping and mailing of the periodical was done by the Doctor and his family. Miss Jane Wood has told of how she and her brother (later to become Dr. Edward Jenner Wood) helped their father with this work. She writes, "We grew to be very proud of the part we had in making good health a part of the State's task."*

The favorable reception the *Bulletin* received and its success were due largely to the reports of the county superintendents. These showed something of the health conditions existing in the different counties and enabled interested officials and citizens to compare their county with others. At first, the county superintendents were negligent in sending in their reports, but in 1893 reports were received from 88 of the 96 counties in the State. Since seven counties had no board of health, only one county had failed to report. During the first eight years, up to 1893, the *Bulletin* became an indicator of the progress being made in public health work in the State. Its articles were republished and commented upon in the state press.

The act creating the State Board of Health specified that the Board was to make a report of its work to each session of the General Assembly. These *Biennial Reports*, submitted through the governor, stated fully the work and aims of the Board; and as they were published with other state papers they became available to the public. When the General Assembly realized the value of these reports, and saw the demand for them from various parts of the State, a resolution was passed by the General Assembly of 1887 ordering a large number to be printed and authorized the State Board of Health to distribute them at its

discretion. Five hundred copies of the report and 10,000 copies of the appendix were printed for general distribution.

The second *Biennial Report* was presented to the General Assembly of 1889; it gave a synopsis of the work carried out during 1887 and 1888, stating that "the work of the Board is still confined to elementary principles." Emphasis was given to the necessity of securing quarantine and vital statistics, though some progress had already been made in these fields. In 1886, mortality returns were received from Wilmington, Charlotte, Asheville, Fayetteville, and Raleigh, and in addition, fifteen smaller towns had begun keeping records. The basis of these were the records of keepers of cemeteries sent in through the superintendents of health. It was pointed out that these were not to be regarded as accurate, but that they gave an indication of what the mortality might be. Attention was called to the fact that many burials made in country districts were not reported. Another source of error pointed out was the rivalry between towns with regard to increases in population. Usually the population was estimated by multiplying by five the number of registered voters. Then, too, mistakes in diagnosis were often made since the county superintendents had to rely on the narration of symptoms gathered from ignorant relatives or friends.

The number of counties reporting as recorded in the *Bulletin* increased from 42 in April, 1887, to 58 in January, 1888, showing that the State Board of Health was making a good beginning in obtaining these vital statistics reports, even

*Letters of Miss Jane Wood to Jane Zimmerman, June 11, 1941, quoted in "Formative Years of North Carolina Board of Health" in *Historical Review*, January, 1944.

if their accuracy could not be guaranteed.

1888 proved to be an unusual year for epidemics. There occurred hundreds of cases of scarlet fever in Wilmington; smallpox was prevalent not only in North Carolina but throughout the United States; measles was widespread in the eastern counties of the State, and an outbreak of cerebro-spinal meningitis occurred in Buncombe County, principally in Asheville.

Yellow fever also made its appearance in Florida during the year and fear of the disease caused near-panic conditions, not only in that State but also in other states, including North Carolina. People fleeing from the disease were detained or refused admission to towns; railway travel was interrupted; and trade of all sorts was hampered or ruined. In Wilmington, where yellow fever had occurred during the Civil War, fear of the disease caused the establishment of inland as well as maritime quarantine from July to November. Special care was taken by many towns to guard against people coming from Florida. There were various beliefs as to the cause of the disease as well as of numerous ways of preventing its spread. Although it was recognized that the disease originated in seaport towns where there was much standing water, there is no mention of mosquitoes being in any way connected with the disease. It was generally considered to be airborne and might be transmitted through fomites and even through any article which may have come in contact with the victim. There is a story of a woman dying of yellow fever whose relatives took a lock of her hair and sent it in a letter to a sister living in a remote district who could not attend the funeral. A curious sensation was felt by the sister as she opened

the envelope and looked and touched the lock of hair. Then, a few days later, she came down with the disease. In Wilmington and other places, barrels of tar were burned on street corners to purify the air.

Many yellow fever refugees from Jacksonville and other Florida towns came to the mountains of western North Carolina. During September, 260 came by train to Hendersonville alone. This town was willing to accept 500, and Asheville made no objection to having them come; while Waynesville extended them a "cordial welcome." As a result, Charleston and Wilmington quarantined against Hendersonville and Waynesville. This caused the State Board of Health to forbid further refugees from coming. The Board decided that this problem was not of mere local concern and wired the authorities of the towns which had agreed to admit refugees asking them to see that the refugees upon arrival were paroled not to leave for a period of ten days, and that they be kept under surveillance to prevent their going into towns where their presence was not desired. Two of the 260 persons going to Hendersonville broke their parole and went to Wilmington, where upon the Board declared there should be no further admission of refugees to the State unless they could be properly cared for and supervised. In the future, colonization of refugees could take place only with the approval of the State Board and in accordance with strict rules laid down by it. Although it was without legal authority, the Board had met the emergency in an able manner and had demonstrated the value of an efficient board of health. This markedly increased the influence of the Board.

At the 1889 meeting of the North Carolina Medical Society, held in Elizabeth City in April, the most important matter considered was pre-

paration for an expected recurrence of yellow fever in Florida. Rules were adopted to control the colonization of refugees from Florida towns infected with yellow fever until arrangements could be made to maintain a strict quarantine during their period of detention.

In autumn of 1889, the boards of health of the southern United States turned seriously to the adoption of means to prevent yellow fever, and active steps were taken by the executive officers of these boards, under the leadership of Dr. Jerome Cochrane, State Health Officer of Alabama. He invited the states to send delegates to a quarantine conference to be held in Montgomery on March 5, 1889. Seven delegates from North Carolina, appointed by Governor Fowle, attended the conference.

The chief concern of the Montgomery convention was the promulgation of rules for the management of an epidemic. These consisted of means of quarantining victims of the disease and the disinfecting and fumigation of houses and articles coming in contact with the patient. Special attention was paid to restrictions on travel; railways, for example, could continue to run trains through infected localities carrying passengers and freight without danger of infection, provided they pass through infected localities at not less than ten miles per hour, with doors and ventilators closed.

The State Board of Health through its *Bulletin* issued during 1888 appealed to teachers to include health instruction in their schools; but there were few books available to pupils or teachers. As a result of a visit by Drs. Jones and Lewis to the State Teachers Assembly, a textbook on hygiene was selected for free distribution.

Another recognition of the influence of the State Board of Health came in the summer of 1888 when Dr. Patrick L. Murphy, Superintendent of the Western North Carolina Insane Asylum at Morganton, requested the Board to inspect that institution as he desired the Board's opinion regarding its water supply and sewage disposal plant. The inspection was made by Drs. R. H. Lewis and H. T. Bahnson, members of the Board. The Eastern North Carolina Insane Asylum at Goldsboro then requested an inspection of its plants. Both institutions were found to be in fair condition, especially the one at Morganton, and suggestions made by the inspectors were heeded.

Publications of the State Board of Health included in the *Biennial Report* for 1887 and 1888 included an "Inquiry into the Causes of Death in North Carolina" and "Suggestions About the Future of Prevention," by Dr. Thomas F. Wood. In this paper, Dr. Wood divides the State into three sections; Eastern, Piedmont, and Western. In the eastern section, malaria abounds to such an extent as to be called "The Disease". Typhoid fever has its highest incidence in the west, where it is known as "The Disease." Diphtheria, while all but universal, abounds mostly in the Piedmont and mountain sections. Other diseases mentioned are croup, scarlet fever, consumption, diarrheal diseases, heart disease, and dropsy. Cancer, it is stated, occurred in an insignificant amount.

During 1888-89, diphtheria was found to be the State's third disease in rate of mortality. Commenting on this disease, the *Biennial Report* states it is more and more apparent that isolation and destruction of all clothing used about the sick chamber, and the disinfection of all articles of furniture, the walls and everything that could have come in

contact with the patient, are measures which should be enforced. A law is needed requiring communicable diseases to be quarantined. At present, notifying people, especially teachers, is all that can be done. The report notes that the medical profession is looking forward to a prophylactic inoculation against diphtheria.

Other diseases considered in the *Report*: Malarial fevers are always present in the State. Their high incidence in 1889-90 was probably due to the mild winter and no killing frost, a condition so necessary for the destruction of the malaria poison. Prevention lies in drainage and avoidance of exposure to night air. Typhoid was present every month of the two years. It was general in distribution and was called the "most dangerous of our diseases", being spread by careless disposal of bowel contents. The report goes on to say that "consumption heads the list in annual fatalities and occurs more in Negroes than in whites, and that there has been a marked increase in the disease among Negroes since emancipation. Consumption is not communicated by breathing the exhalations of the lungs of the consumptive; nor from the moist expectorations, but is spread from the dried matter. It is, therefore, necessary to destroy the sputum, prevent spitting on the floor or carpet, and provide spit-cups which can be burned with their contents."

"The discovery which Dr. Robert Koch of Berlin has recently announced to the world is undergoing a most searching trial and it is premature to say how much importance is to be attached to it, although it is accepted by many good observers and with a knowledge of this highly probable theory we have the groundwork for practical action."

At the conjoint session of 1892 with the State Medical Society,

consideration was given to the private sanatoria for tuberculosis which were recognized as doing good work throughout the State. It was suggested that the State should build sanatoria for poor citizens. A general discussion of tuberculosis ensued in which it was brought out that consumption had become implanted in places much frequented as resorts for consumptives, whereas in former years they had been free of the disease. Asheville, in 1878, had boasted that there had never been a case in a native and recommended the place as a resort for tuberculous patients. Dr. Westry Battle stated that when he came to Asheville in 1885, there was a prevailing idea that the section, embracing an area of about 100 miles by 50 miles, enjoyed complete immunity from consumption. It was said that a tuberculous patient carried to this county would not transmit the disease. There are no vital statistics to prove this, but the section does enjoy (relative) freedom from the disease among the natives.

Dr. T. F. Wood died on August 22, 1892, and Dr. R. H. Lewis was elected Secretary of the State Board of Health to succeed him on September 2, 1892. Dr. Lewis, in accepting the post, said: "In the death of Dr. Thomas F. Wood of Wilmington, late Secretary of the North Carolina State Board of Health, the State lost one of its most patriotic and useful friends. He was an able, conscientious, and accomplished physician...always in the forefront of those working for the elevation and advancement of his profession and doing more to promote both than any man we ever had".

"Having been honored by the Board in my election to the secretaryship made vacant by his decease, I cannot assume the duties and responsibilities of the office

he adorned without testifying to his high and admirable qualities, the loss of which is irreparable."

Dr. Lewis stated that Dr. Wood "was a great apostle of sanitation and was the father of the North Carolina Board of Health, not alone in the sense of originating it, but also in that of a wise and tender

parent who nourished and sustained it during its years of feeble and struggling infancy. — Indeed, it may be said that he gave his life for the cause, for it was in making a tour of inspection of convict camps in the western part of the State while climbing a steep mountainside that he felt the first intimation of the disease (aneurysm of the aorta) which caused his death."

Developmental Years, 1892-1909

During the eight years that the State Board of Health functioned under the Act of 1885, the Board had gained influence throughout the State and the people had come to look to it for protection against epidemics and the spread of contagious diseases. The improvement in the State asylums and in county prisons, poor-houses and public buildings had been rightly ascribed to the leadership efforts of the Board. Of great importance was the education of the people in regard to disease prevention, especially as to the necessity for towns and cities to have safe water supplies. In spite of these favorable developments, the members of the Board and the county superintendents of health were dissatisfied with a number of provisions in the existing law, especially the regulations concerning vaccination. Proof of the inefficiency of this provision was the fact that smallpox occurred in most parts of the State year after year. The State Board and the local authorities were convinced that vaccination laws could be made effective only if they were compulsory.

It had been pointed out that doctors who attempted to vaccinate children in the public schools often encountered much opposition. Dr. I. W. Lewis, a member of the Board from Northampton County, related his experience at one school. He had put up a notice stating that he would visit the school on a certain date to vaccinate all who desired to be vaccinated. When he reached the school, he was surprised to find only one present. Not one pupil was present, and also the teacher was absent.

A somewhat similar incident occurred as long as twenty years later, in 1914, and was described by the Health Officer of Nash County. The county board of health had passed an ordinance requiring pupils and teachers to be vaccinated before entering school. Little progress was made with the vaccination program during the spring and summer; but in the autumn when the schools opened the health officer visited each to give vaccinations. Opposition was outspoken in most county communities.

From the days of the Civil War, smallpox had been one of the most prevalent and one of the more serious diseases of the State. It had occurred year after year in many counties. Quarantine was under the jurisdiction of local authorities and although ineffective, it was highly expensive; and it had not reduced the spread of the disease. There was great fear of vaccination and relatively few persons took advantage of this preventive measure. One report states that only those applying for life insurance got vaccinated.

Year after year the State Board of Health and the State Medical Society petitioned the General Assembly to pass legislation requiring mandatory vaccination, especially for school children; however, these requests went unheeded, and quarantine remained under the direction of the county superintendents of health, many of whom neglected or refused to quarantine until an epidemic occurred.

The State Medical Society at its annual meeting held in 1892 asked the Board of Health to send a committee to Raleigh during the 1893

session of the General Assembly to lobby for a mandatory vaccination law. The Board, having on several occasions sent such petitions to the Legislature with no result, and realizing that vaccination laws were not the only defect in the health act, decided to call a general health conference to meet in Raleigh on January 24, 1893 at the time the Legislature convened. Invitations to attend were sent to 650 persons including officers of the state government, members of the General Assembly, county superintendents of health, mayors, county commissioners, physicians, lawyers, and other prominent citizens.

The conference was well attended and drew up a suggested bill to be presented to the General Assembly. At the opening of the Legislature, Governor Thomas Michael Holt spoke in the interest of health work and asked the lawmakers to consider carefully "any suggestions that may be made to them by the Board." He suggested the "appointment of a special joint committee to confer with the health authorities in regard to needed sanitary legislation." In response to the request from Governor Holt, the General Assembly appointed a Committee on Public Health, the first such committee appointed by any legislature in the history of North Carolina.

The bill decided upon at this conference was presented by Senator Lucas of Bladen County and was reported unanimously in the committee. Dr. R. H. Lewis, Secretary of the Board of Health, appeared before the Committee and, in addition, he had a number of personal interviews with senators in regard to the bill. It passed the Senate 34 to 8, though it had been weakened by a number of amendments. The House Committee gave unanimous approval, but on the second reading, to the dismay of the Board, it was tabled by a

considerable majority. However, by the tact and skill of the Honorable Edmund Jones of Caswell County, it was taken up again and with the active assistance of the best men in the House, medical and legal, it passed. Some of the many amendments made to the bill should have been corrected, but friends of the State Board advised against attempting any changes on the grounds that reconsidered, it might come out in worse shape than the Senate had left it.

As regards smallpox, instead of passing the law requested by the State Board of Health, it merely stated that on the appearance of a case of smallpox every person admitted to a public institution in a county should be vaccinated and the county superintendent was to vaccinate free of charge any person not able to pay whether in a public institution or not. The law also provided that the "authorities of any city or town, or the board of county commissioners of any county might make such regulations and provisions for the vaccination of its inhabitants as is necessary to protect the public health." This law was found to be only partly effective in that it failed to state particularly whether the law granted this power at all times or only when a case of smallpox actually occurred in the community.

A portion of the Act of 1893 generally regarded as commendable was that of regulating the pay of county superintendents of health. Under the new act these officers could charge the usual medical fees that prevailed in their county for a particular service; or, if mutually agreed upon by the county commissioners and the superintendent of health, they could receive from the county a salary of not less than \$100 or more than \$1,000 in lieu of fees.

However, one provision of the 1893 health law drew much unfavorable criticism from the medical profession. The governor was given the right to appoint five instead of three of the members of the Board of Health, and the Medical Society, four. The opposition to this was based on the belief that it was not wise for a majority of the Board of Health to be appointed by the governor, and the fear was expressed that under political pressure the composition of the Board might be such that the "child would hardly be recognizable by its own mother—the State Medical Society." Another unfortunate feature was that the term of office of members elected by the State Medical Society was reduced to two years, this being the term of appointment of those named by the governor. Still another disappointment: the annual appropriation of \$3,000 asked for was cut to \$2,000, the same as heretofore. However, the \$250 limit on the state printer was removed, and the emergency fund for the control of epidemics was increased from \$2,000 to \$2,500.

Much better protection against the spread of contagious diseases was provided in the new law; however, inland quarantine was left in the hands of the county superintendents of health. These officials were made responsible for fumigating and disinfecting the rooms occupied and the articles used by any person sick of smallpox, scarlet fever, measles, diphtheria, typhoid fever, cholera, and yellow fever. An important provision placed the responsibility for reporting cases on the householder and the doctor. The expenses involved in carrying out the quarantine and disinfecting measures were to be borne by the householder in whose family the disease occurred. Failure to comply with quarantine rules was a misdemeanor and subject to a fine.

Special attention was given in the act to the protection of school children, especially in times of epidemics. The local boards of health were requested to give the school committees of cities and towns, principals of private schools and the county superintendent of public instruction notice of all cases of contagious disease which came to their knowledge. On the other hand, any school committee, superintendent or principal who knew of any household where dangerous diseases existed was required to see that no pupil from such a household should be permitted to attend school unless the pupil presented a certificate signed by the attending physician, a city health officer or the county superintendent of health.

The State Board of Health was given general oversight and care of all inland waters with the right to analyze those waters from time to time to ascertain if they were safe to be used as a source of domestic supply and would not endanger the public health. The Board was also authorized to consult with and advise the boards of directors of all state institutions, town and city authorities, and corporations and firms in charge of systems of water supply or sewage disposal that they were obligated to submit their plans to the State Board of Health for its approval or recommendations.

For the first time the State Board of Health was authorized to regulate common carriers so as to prevent them from spreading disease by transporting infected persons or the bodies of persons who had died from infectious diseases.

Under the law of 1893 the duties of the State Board of Health were extended to include an inspection each year of all public institutions and included in this, inspections were to be made of the state peni-

tentiary and convict camps. After making the inspections, reports were to be made to the respective boards of directors or trustees together with recommendations for improving sanitary conditions.

Although the 1893 Act relating to the Board of Health was not all that the medical profession of the State desired, it was generally recognized as a great improvement over preceding acts. For one thing, it defined more clearly the duties of the State and local boards, and in many instances these duties were made mandatory; and in spite of its many imperfections it became the basis upon which better protection from disease was obtained for the people of the State. It marked a culmination of the pioneer work and legislation in the history of the health movement in North Carolina. It gave assurances that the State Board of Health was now regarded by the people and their representatives in the Legislature as a permanent agency which was to receive support from the General Assembly. In other words, the passage of the Act of 1893 was evidence that the State Board of Health had grown from a board having little more than nominal authority into an institution of considerable power and significance. National recognition also came in an invitation to send delegates to a "Conference of State Boards of Health" held in New York City on April 5, 1893. The President and Secretary of the North Carolina Board went as delegates. Later in 1893 they attended as delegates the Pan-American Medical Conference and the International Congress of Public Health.

During 1899 smallpox again prevailed extensively in the State. Dr. Henry Long and, later after Dr. Long's resignation, Dr. Joshua Tayloe was employed to travel over the State to consult with and advise the local sanitary authorities as to

the proper means for protecting the public against the disease. The chief difficulty in handling smallpox was mistaken diagnosis—calling it chickenpox. In Wilson County where the disease was very widespread, Dr. W. S. Anderson, the County Superintendent of Health, refused to report it as smallpox. The local authorities would not admit it was smallpox until an expert from the Marine Hospital Service sent by Surgeon-General Wyman declared it was unquestionably smallpox. Representatives from contiguous counties, at a meeting held in Rocky Mount on June 14, threatened to quarantine against Wilson unless proper precautions against smallpox were taken immediately. From that time the disease was reported as smallpox; the total number of cases occurring was estimated to be between 1500 and 2000.

In 1902 smallpox again was widespread throughout the State. As many as 50, including many well-to-do persons, died of the disease in one county. Again, in 1905, it was more widespread than ever before; up to May 7377 cases were reported, 3636 being among whites, and of the 31 deaths, 13 were in whites. By this time the disease, though more widespread, had become less likely to be fatal and Negroes were not so seriously affected constitutionally as whites, though their skin manifestations were usually more pronounced. This caused still more cases of mistaken diagnosis and the refusal by local authorities to quarantine.

As a result of the widespread incidence of the disease during 1905, Hyde County ordered compulsory vaccination in schools. This was contested, but the Attorney General ruled the local requirement to be legal. Also, a township in Washington County ordered compulsory vaccination and closing of schools unless both pupils and

teachers were vaccinated. This was opposed by the county superintendent of schools but again the Attorney General ruled it to be legal.

In many places the disease occurred in epidemic proportions every winter, so much so that a number of rural schools had to close for several years in succession. Relatively few persons had been vaccinated since many people were more afraid of vaccination than they were of the disease itself. This situation continued until the spring of 1914, following the passage by the General Assembly of 1913 of the law making smallpox not a quarantinable disease; the State Board of Health then adopted a new procedure. Smallpox was to be reported but not quarantined. When reported, the county health authorities were to post placards at community centers advising that smallpox was present in the community but that it would not be quarantined since it could be prevented by vaccination. The people, especially in the eastern counties where the disease was more prevalent, were astounded at this regulation and their astonishment grew greater when Negroes were encountered on the streets and roads, at post offices, and other places with faces and hands covered with smallpox sores; however, as a result there was such an increase in vaccination that smallpox soon passed out of the picture as a prevalent disease in North Carolina.

When the General Assembly of 1877 named members of the State Medical Society to be the State Board of Health, it also specified that each county medical society should be the county board of health. These boards were to cooperate with the State Board of Health in carrying out public health measures; and they were to look to the county and town authorities for their executive duties and powers and to act with

these in drawing up such rules and regulations as they deemed expedient.

By September, 1879 the organization of county boards of health had been completed in 50 counties. However, this plan did not prove satisfactory. It resulted in some counties belittling the office by the very small salary paid; thereby securing the most inferior physician in the county for an office of such great responsibility. The State Board decided that a compromise was desirable by which the county commissioners would still retain complete control, and would act in health matters with the advice of physicians associated with them. A suggested bill was prepared and presented to the Legislature of 1879 which, instead of considering its provisions, gave the election of the superintendent of health and the fixing of his compensation to the board of county commissioners. At the same time they reduced the term of office from two years to one, a plan which resulted in further belittling the office by some counties farming out the office to the lowest bidder.

The General Assembly of 1901 changed the law by abolishing the county boards of health and creating County Sanitary Committees endowed with definite responsibilities and powers; and the term of office of the county superintendent of health appointed by them was restored from one to two years.

The General Assembly of 1905 enacted a law stating that if the sanitary commission of any county should fail to elect a county superintendent of health within two years, the State Board of Health could appoint a registered physician of good standing to serve the remainder of the regular two-year term and fix his compensation to be paid by the said county commissioners.

The General Assembly of 1911 created County Boards of Health to take the place of the Sanitary Committees. These boards were to be composed of the chairman of the board of county commissioners, the county superintendent of schools, the mayor of the county town and two physicians selected by these three county officials to serve with them. This arrangement is still in effect.

Much of the work of the State Board of Health during the early years was aimed at disease prevention and control, but the greatest work of the Board had been its educational activities. Special treatises on various aspects of public health work had been prepared by members of the Board for inclusion in the *Biennial Reports* and later, when printing was secured from the state printer, were published separately for distribution to county and city officials and others interested in public health work. An important event in this field was the publication of the monthly *Health Bulletin* which was read by citizens in all parts of the State, and, many of its articles, especially those on disease prevention, safe water supplies and safe sewage disposal, were reprinted and commented upon in county and city newspapers. This marked an important step in health education, and the popularity and influence of the *Bulletin* has been maintained through the years.

The Act of 1893 greatly increased the status of the State Board of Health, which reacted with renewed activity. A well-equipped office was established in Raleigh for the Secretary who was given an annual salary of \$1,000. Steps were taken immediately to carry out the duties prescribed by the legislature.

The General Assembly of 1893 assigned to the State Board of Health the yearly inspection of all

state institutions. Among inspections carried out during the remainder of the year were the two hospitals for the insane, the penitentiary and convict camps, and the three more important schools — the Agricultural and Mechanical College (now North Carolina State) at Raleigh, the State Normal and Industrial School (now the Woman's College of the University) at Greensboro, and the University at Chapel Hill. The reports of these annual inspections indicate that the recommendations made by the State Board of Health were being carried out and had resulted in improvement in conditions of health and sanitation.

The inspections of the University give interesting sidelights on living and sanitary conditions at the state's most important school in 1893-4, and of improvements which took place from year to year. The 1893 report states, "There were no sanitary conveniences at the University until last year (1892) when the basement of the library building (Smith Hall) was fitted up for the purpose with a fair number of water closets, urinals, bath tubs and shower baths for the number of students in attendance." "The water supply," the report goes on to state, "is pumped by steam from the deep well on the campus to tanks in the attic of one of the buildings; the sewage is discharged into a small branch about one thousand feet from the buildings, so no fear of trouble arising from this method of control is apprehended."

Sanitary conditions at the University had improved by 1895 and fixtures of an improved type had been installed and the sewage discharged into a small branch at the proper distance from the buildings. However, the water supply was so limited that no use could be made of the baths, and the urinals had irregular flushings. This was due

the use of water in the newly-installed electric light engines.

The report for 1899 states that the method of heating the dormitories by fireplaces is "antiquated, inconvenient, expensive, and inadequate." As to sanitary conditions, the lavatory doors were found locked and the janitor explained that the water was out; attempts to flush the closets verified this. The baths under the library had also fallen into disuse. The report also called attention to the fact that nearly half of the students roomed and boarded in the village where there was no inspection of water or sanitary arrangements.

Many of the conditions described in the 1899 report continued to exist during the period 1902-6; due to lack of toilet facilities a majority of the students living in the dormitories were forced to use the nearby dense woods south of Gerrard Hall and the South Building.

The inspection of 1902 states that the water closets under the library would not flush. As to the water supply, a pump had been substituted for the bucket and chain in the open campus well. Although this is "an innovation which does violence to the sentiment which has clung to the old well for a century, it is clearly in the interest of health."

Sanitary conditions had further improved by the time of the 1905 inspection. New waterworks had been completed and monthly inspections were being made of the watershed; and chemical and bacteriological tests showed satisfactory results. The new heating plant recently installed circulated hot water from one central plant and heat could be regulated at the plant.

The report of 1908 goes into detail as regards unfavorable con-

ditions found. It states that "the plumbing in the Carr and Old East buildings still remain in bad shape; and owing to the rapid growth of the University, the supply of heat, water, and lights is insufficient." Sanitation was reported to be good as far as it goes, but much is to be desired, and a great deal could be done in the way of improvement were the money forthcoming. In fact, inadequacy stares one in the face at every point. Dormitories, mess halls, and even lecture rooms are cramped. While the water supply is good and adequate, it is not what it should be — the standpipe should be at least twenty feet higher in order that water may reach freely and at all times the upper dormitories; filter and receiving basins are entirely inadequate; and at present the University has twice as many students as it can handle. The little infirmary is wholly inadequate and entirely out of place. It should be enlarged, as it now has only eight beds; there should be at least sixteen.

"Badly needed is a landscape gardener to lay out a scheme whereby the campus may become an object lesson to all on the aesthetic side of life."

In order to interest the people in health matters and sanitation, the State Board of Health planned to hold three conferences in different parts of the State. The object of these was stated as follows: "Efforts have been directed to educate people in the principles of hygiene and impress upon them the importance and value, looked at from the monetary point of view as well as from that of life and comfort, of the proper observance of the rules of health." The first conference was held at Salisbury on September 11, 1894 and was well received by the people, with good attendance at every meeting and favorable reports from the newspapers. Members of

the Board present were Drs. H. T. Bahnson, S. W. Battle, G. G. Thomas, John Whitehead, and R. H. Lewis. Of the papers presented, "The Prevention of Tuberculosis as We Know It Today," by Dr. Battle, and Dr. Lewis' paper on "Quarantine and Disinfection in Relation to Contagious Diseases," evoked the greatest interest.

In a paper on "Malaria", Dr. Lewis gave an account of the different theories regarding this disease, especially the belief that the germs of malaria enter the body by drinking water and the poison may be gaseous in nature. This theory, he explained, was the accepted belief up to 1866; then a small alga or waterplant was described as the cause. But in 1881, Laveran, a French scientist, claimed to have discovered in the blood of malarious persons, rapidly moving spherical organisms of about the same diameter as the red corpuscles. "There is a growing consensus," explained Dr. Lewis, "that malaria is due to the introduction of this organism, known as *Plasmodium malariae* into the system; that it lives and grows in the red corpuscles and finally causes them to disintegrate. It is now generally believed that this little blood parasite is the cause of malaria. Is this poison carried in the water?" asked Dr. Lewis. "This must be proved to everyone so as to induce them to seek a water supply that cannot be contaminated by it. Changing from open wells to deep driven wells, or bored wells, or still better to cisterns is the safest method."

Among the questions asked from the audience were: "Will whiskey keep off malaria as is generally believed? And can ice gathered from ponds where malaria exists give malaria?" To this, Dr. Bahnson answered, "It is not only possible, but it is certain."

The second conference was held in Washington on November 16, 1895 and the third in Charlotte on October 16, 1896. Both were well attended, people being turned away; practical papers were read and health pamphlets distributed. Conferences were also held at Goldsboro on October 14, 1897 with gratifying attendance; and at Winston-Salem, on December 7, 1897 where the attendance was disappointing, no doubt due to very bad weather.

The Legislature of 1895 was dominated by members of the Populist Party who had canvassed and been elected on a platform calling for conservative measures in the state government. Anxiety existed on the part of the members that there would be a curtailment of the Board's services. But these fears turned out to be without foundation, as the Legislature as a whole proved to be very favorable to the Board's work. Dr. Ab Alexander, Superintendent of Health of Tyrell County, Chairman of the House Committee on Public Health, was described by Dr. Lewis as, "a faithful sentinel upon the watchtower." He was responsible for killing a number of bills making changes in the health and medical laws.

Governor Russell evidently desired to keep politics out of the State Board of Health, as is shown by his non-partisan appointments to fill vacancies on the Board.

Reports on the connection of drinking water to malaria were reviewed at the 1895 meeting of the State Medical Society. One report was that a simple driven pump had not had the expected result in diminishing malaria. Dr. Lewis said it was not impossible for malaria germs to go down the sides of a pipe in a driven well for 75 feet. In Jacksonville, however, three patients had used only bottled water "absolutely protected" but had

requent and severe attacks of malaria.

Dr. Lewis then reviewed progress in accepting the facts about malaria. "Malaria is a very mysterious poison in its behavior and in the present stage of medical opinion we are not able to say with certainty whence it cometh nor how it travelth. We know that it is associated with low, wet, marshy sections, and that it is usually found along watercourses in the rolling country. We also know (I think I may safely say we know) that the protozoa known as *Plasmodium malariae*, a blood parasite, is the cause of the disease. It has also been demonstrated that the germs are found in mosquitos as well as in the red corpuscles of the blood. The old theory that malaria was in decaying marsh miasm has been abandoned, but the transportation of poison through the air is still held, but not so firmly nor universally as formerly.

"The transmission through surface drinking water has a good many facts to support it and is largely accepted. But the latest and to my mind the most satisfactory theory is that it is carried by the mosquito. Believing the plasmodia to be a ponderable animalcule residing in water or certainly in moist places, I cannot believe it can be gotten up from its bed to which it clings into the air currents as the dust is, but it is easy to understand that it can be carried through the air as a passenger on or in a mosquito. As a female mosquito after laying her eggs on the surface of stagnant water dies, she sinks to the bottom and disintegrates, thereby setting free her contained plasmodia. The manner of infection of drinking water is plain, it seems to me, though Koch, the greatest of the bacteriologists, says that it is not transmitted through the medium of water. For facts that it is trans-

mitted through drinking water I would refer you to my pamphlet on "Drinking Water in Its Relation to Malarial Diseases." But Koch, the great master of science and therefore one who carefully weighs his words, goes further and, as a result of his recent studies of malaria in German East Africa, declares without any qualifications whatever that it is conveyed not by air, not by water, but by mosquitos. Such a statement from such a man carries very great weight, particularly when the theory he endorses more completely meets the conditions than any other."

During the fall of 1899 an epidemic of typhoid occurred at the State Normal and Industrial School at Greensboro in which one-third of the total college population had the fever and fourteen died. Every county in the State was represented in the student body — and most counties had at least one sick. An account of this epidemic gives the views regarding typhoid held at the time. An investigation of the epidemic showed the plumbing in the dormitories to be in bad condition; and the baths and lavatories leaked, the basement walls were wet and stained; the water supply was bad; there was a leaking soil pipe from the ten water closets in the main building; and the soil in the basement was saturated under the butler's pantry and within 18 inches of the "butter room." This was regarded as the probable cause.

The cause, whatever it was, was purely local, the sickness being confined to those sleeping and eating in the buildings. At the time of inspection there had been about 100 cases, with three deaths — and some were convalescing and many were still sick.

There was no reason to suspect the milk supply. The water from wells near the dormitories was found to be bad. The local authorities

believed that the leaking soil pipe was the cause of the epidemic on the ground that every time the butter room was opened a draft of air from the outside blew over the sewage-saturated earth, through the ventilator opening in the wall, carrying with it the germs and infecting the butter and possibly other food products in the general store, the door of which was ten feet from that of the butter room and opened on a connecting passage. This condition was pronounced unsanitary in the highest degree and that sewer gas in sleeping and living rooms was undoubtedly the cause of the disease. Dr. Lewis said, "I could not accept this theory."

The old soil sewer was entirely removed; the leaking terra-cotta pipe was replaced by iron pipe laid in lead joints; the contaminated earth was removed and the space disinfected and refilled. The wells were filled up and city water supply was installed.

As is often the case following epidemics, the outbreak of typhoid at the State Normal and Industrial School created state-wide interest, especially as regards the prevention of typhoid by improving sanitation and providing safe water supplies.

At the meeting of the State Medical Society in 1901, Dr. Lewis reported that the Department of Agriculture was making free biological examinations of water in addition to chemical analyses. This was important in locating cases of typhoid carried in contaminated drinking water; since it was stated that 8,000 to 10,000 cases of typhoid occur in the State each year. In spite of this, Dr. Lewis went on to say, "the indifference of the profession in having water analyses made in cases of typhoid is difficult to understand. Only 13 applications for analyses were received from physicians in nearly four months."

The first *Biennial Report* of the State Board of Health, for 1879-80, contains a circular on "Ventilation, Drainage, and Drinking Water" which points out that typhoid and certain enteric fevers common in North Carolina are due to "bad wells, foul yards, privies, and cesspools tainting the air with their gases." This early recognition of safe water supplies was repeated from year to year, along with appeals to each General Assembly for legislation which would bring about improvement of public water supplies. In 1888, Colonel J. L. Ludlow, of Winston, the engineer member of the Board, published an article on "Sewage of Cities and Towns", and Dr. H. T. Bahnson, of Winston, also a member of the Board, contributed an article on "The Public Water Supplies of Towns." These were published in the monthly *Health Bulletin*.

On October 15, 1895, Dr. J. J. Kinyoun of the Marine Hospital Service addressed the State Medical Society on "Bacteria." As a result, Drs. Albert Anderson, of Raleigh, and W. T. Pate, of Gibson Station, were sent for training in sanitary biology at the Laboratory of the Marine Hospital Service in Washington. Also, as a result of Dr. Kinyoun's address, a resolution was passed by the Board requiring chemical and bacteriological examinations of municipal water supplies. Dr. Venable, of Chapel Hill, undertook to do the chemical while Drs. Anderson and Pate carried out the bacteriological examinations. The engineer member of the Board was directed to inspect all municipal water plants.

In 1903 there had been an increase in the number of public water supplies and many more were in process of being organized. As this increased the work being done by the Department of Agriculture, the State Board of Health arranged to share the expense of the Laboratory. In

In addition to water analyses many pathological specimens were examined; these included sputum for tubercle bacilli; feces for intestinal parasites; throat exudates for diphtheria bacilli, and blood for malaria parasites. The total number of specimens examined increased from year to year; in 1901 there were 194; in 1902, 357; in 1903, 476; and in 1904, 785. Approximately two-thirds of all these were of water. That this laboratory work was efficiently carried out is evidenced by the report of the American Public Health Association's Committee on Water Legislation which, in 1901, placed North Carolina and only three other states in the first class as regards methods of protecting drinking water.

The Legislature of 1903 amended the law governing public water supplies by requiring the State Board of Health to make monthly biological analyses and quarterly chemical analyses of each water supply. To support the laboratory for this work the Board was empowered to charge a fee of \$5.00 for each biological analysis. These fees and one-half of the salary paid by the Department of Agriculture were the sole income of the laboratory; while fully one-half of the work was done free for the physicians of the State.

The General Assembly of 1905 appropriated \$600 annually for the support of a State Laboratory of Hygiene; this amount, however, was found to be insufficient and the Department of Agriculture continued its assistance. As some water companies failed to have monthly analyses made, the General Assembly of 1907 made the requirement that each company was to pay an annual fee of \$60, later increased to \$64, whether they had examinations made or not. This, with the \$600 appropriation, made it possible to reorganize the State Laboratory of

Hygiene and secure a full-time director. The laboratory was placed under the supervision of the State Board of Health and Dr. C. A. Shore was elected as director at a salary of \$2000 a year.

In connection with the recommendation of the Board to the General Assembly of 1907, Colonel J. L. Ludlow made the following report of the public water supplies of the state: "It is gratifying to note the increased interest that is being taken in improving the quality of public water supplies by various municipalities and the increasing readiness of the authorities to cooperate with the State Board of Health to improve and safeguard public water conditions. Also, there is increased appreciation of the importance of frequent inspections of watersheds and sanitary surveys to supplement the periodic analyses of the water."

Col. Ludlow announced that the number of towns and cities owning their own water plants had increased from five to fifty within the past twenty years; and during the past two years ten new water plants had been established, and the number was increasing constantly. A number of smaller towns had installed water supplies and sewage systems. "It is doubtful if any other state in the Union can present a better showing in this line of municipal sanitation when the size and population of the towns are considered."

An important decision of the North Carolina Supreme Court, in the case of "Durham against the Eno Cotton Mills" of Hillsboro, established the principle that "no stream used for drinking purposes can be polluted with raw sewage by any person or company." Dr. Lewis declared this to be the most important thing that had occurred in the state during the past two years.

The General Assembly of 1909 made it a requisite that all public water companies file plans and specifications with the State Board of Health and authorized the Board to make necessary rules and regulations for the protection of public watersheds and plants and furnish advice to those in charge of such plants. Of 63 water plants, 45 readily complied with the new regulations; and the State Board took an active part in carrying out measures of control.

The *Biennial Report* for 1901-02 gives a summary of the state's vital statistics, these records being from towns and cities only since records from rural districts were not sufficient to be representative. Reports for 1901 from 22 towns showed a population of 132,900 — 79,700 being white and 53,200 colored. Reports were received from 26 towns in 1902, the population being 153,950, of whom 92,100 were white.

The incidence of the more important diseases during 1901 was as follows: typhoid was responsible for 116 deaths, of which 65 were white. There were 95 deaths reported from malaria, 39 of whom were white. Pneumonia was next in fatality to the diarrheal diseases, there being 241 deaths — 122 were white. Consumption is stated to be "our most fatal disease" — of 289 deaths, 116 were in whites. In 1904 twenty-eight towns with an aggregate population of 173,700 had an average death-rate of 20 per thousand — 15.2 for whites and 26.3 for colored. The death-rate for colored was about 10 per thousand more than for whites.

In 1903, Dr. Charles W. Stiles of the United States Public Health Service spoke before the State Medical Society at Hot Springs and called attention to the prevalence of hookworm disease in the South. An educational campaign was opened against the disease, it being

noted that Dr. Stiles' report stated that dirt-eaters are victims of the disease, and that their symptoms are caused by hookworms and not by eating soda biscuits and fried meat as was generally thought. The visit of Dr. Stiles was recorded in the minutes of the Board with the following comment: "His visit is an epoch in the history of North Carolina and of the South."

Drs. J. R. Nicholson and W. S. Rankin, working under the State Board of Health during the fall of 1903 found hookworm disease to be very prevalent in North Carolina. Copies of Dr. Stiles' official report were sent to the doctors of the State and articles on hookworm disease were published in the *Health Bulletin*. However, only 32 specimens for microscopic examinations were received during the year. This was an indication of the need for further educational work. Dr. W. S. Rankin of Wake Forest offered to give a month of his time to the Board without charge in making a personal investigation, proposing to visit with his microscope the doctors in a number of eastern counties. He began his investigation by a visit during Christmas week to Northampton and Edgecombe Counties. The results were so discouraging that the proposed spring tour of three weeks was abandoned.

The General Assembly of 1907 passed an act authorizing the establishment of a State Sanatorium for the Treatment of Tuberculosis and appropriated \$15,000 for the purchase of a site and the erection of buildings and \$5,000 annually for its support. It was located at Montrose in Hoke County and was opened in November, 1908, with a capacity of 34 patients. A law requiring the separation of cases of tuberculosis in the hospitals for the insane, in the state prisons, as well as in the county jails was also enacted.

Other acts of the General Assembly of 1907 were to pass an appropriation of \$2,000 to enable the State Laboratory of Hygiene to provide Pasteur treatment; and the annual appropriation of the State Board of Health was increased from \$2,000 to \$4,000.

The year 1909 was a momentous year in the history of the State Board of Health. The General Assembly, meeting in the spring, made provision for (1) a full time state health officer; (2) the collection of vital statistics from towns having a population of 1000 or more; (3) the State Board of Health to have general care and oversight of all inland waters; and all public water companies were to file plans and specifications of their plants with the Board. The Board was to make necessary rules and regulations for the care of public watersheds and plants and give advice to those having charge of public water supplies; (4) the counties were to provide free diphtheria antitoxin for county indigents; (5) the maintenance appropriation for the Tuberculosis Sanatorium was increased from \$5000 to \$7500 per year and an additional \$30,000 for two years was given for permanent improvements.

The composition of the State Board of Health was set out in the Act. The Board was to have a president, a secretary, and an executive committee. The executive committee was to be composed of the president, elected from the members of the Board, who would serve for six years, the engineer member of the Board, and one other member. The secretary was to be the executive officer of the Board and was under its direction to devote his full time to public health work and was to be known as the State Health Officer. The annual appropriation of the Board was increased from \$4000 to \$10,500.

It is worthy of note that the General Assembly of 1909 passed this legislation through the instrumentality of Dr. Richard H. Lewis; in fact, all bills in any way relating to health passed without amendment. The provisions of the Act made it necessary for Dr. Lewis to resign as part-time secretary of the Board.

In regard to the resignation of Dr. Lewis, Dr. G. G. Thomas, President of the State Board of Health, said: "Following Dr. Wood the pioneer of sanitation in North Carolina, he took up the work with zeal and enthusiasm which has been guided and carried on by his successful judgment to its present high state. To Dr. Lewis belongs the spread of sanitary knowledge in the State of North Carolina and the present influence of the Board of Health in the Commonwealth.

All of you are aware that these steps toward the commanding position it now holds have been slow and faltering, but the State at large has come to realize the fact that the State Board of Health has done good work and its recognition, I think, is thoroughly voiced in the action of the last Legislature in increasing the funds for its support."

Dr. Lewis continued to be a leading member of the State Board of Health until his death in 1926; his knowledge of the principles of public health work and his experience in pioneer work in North Carolina made him a valuable adviser in the work of the Board.

Dr. Richard Henry Lewis was born in 1850 at Greenwreath, in Pitt County, the plantation of his widowed mother; grew up in Tarboro where his mother had moved when he was a small boy. At an early age he had tuberculosis of the hip which left him lame so that it was necessary for him to use crutches through-

out his life. In his attitude toward his lameness, he was completely without self-consciousness, although it was a handicap. It never embarrassed him, and he never allowed it to embarrass others, and it did not interfere with his long and useful life.

At sixteen he went to Chapel Hill where he led his class; in 1868 when the University closed, he went to the University of Virginia to finish his academic education. He began the study of medicine at Virginia, and finished his medical course at the University of Maryland, receiving his M. D. degree. Later he studied diseases of the eye and ear at the Royal Ophthalmic Hospital in London.

After practicing for a short time in Savannah, Georgia, he returned to North Carolina in 1877 and he and his brother-in-law, Dr. Kemp P. Battle, Jr., opened an office in Raleigh, and soon their clinic became known throughout the State.

When Dr. Thomas F. Wood of Wilmington, the founder and first secretary of the State Board of Health, died in 1892, Dr. Lewis was elected to succeed him. Since the State Board of Health's annual appropriation up to 1907 was never more than \$2000, the Board could not afford an office of its own, and most of its work was carried on in his office.

During Dr. Lewis' term of office, the foundation of the State's present health work was laid. In spite of meager funds, important work was done, the most important being the education of the people, including the Legislature, in public health. To name important specific accomplishments of the Board during his secretaryship may be mentioned: (1) regular examination with supervision of public water supplies; (2) inauguration of the sanitary engineering service; (3) enactment

of legislation to protect school children from epidemic diseases; (4) improvement of county health organizations; (5) public health conferences held in different towns of the State; (6) publications in the *Bulletin* and in pamphlets, many of which he wrote himself, about the State's public health problems; (7) establishment of the State Laboratory of Hygiene in 1905; (8) the State Sanitorium for Tuberculosis in 1907; (9) the enactment in 1909 of the "First Practical Vital Statistics Law in the South"; (10) legislation providing for the purchase of diphtheria antitoxin by state contract and making this antitoxin available to the public at greatly reduced cost; (11) made plans for state control of hookworm disease directed by the Rockefeller Sanitary Commission; (12) state recognition of pellagra as an important health problem; (13) the provision by the General Assembly of 1909 for a full-time state health officer.

Public health work in North Carolina early received national recognition, as is shown in the election of Dr. Lewis as President of the National Conference of State and Provincial Health Authorities of North America in 1906 and President of the American Public Health Association in 1908.

At home Dr. Lewis received every honor within the gift of the State Medical Society — he was President of the Society, Chairman of the Society's Legislative Committee, President of the State Board of Medical Examiners, President of the North Carolina Association for the Prevention of Tuberculosis and President of the Raleigh Academy of Medicine. Due to his interest in education and public schools he was a member of the Raleigh School Committee from 1885 to 1910; also of the executive committee of the Trustees of Saint Mary's School,

the episcopal school for girls. For thirty-two years he was a Trustee of the University of North Carolina and a member of the executive committee of the trustees for many years. For thirty years he was a member of the Board of Trustees and of the Executive Committee of Saint Augustine School for the colored of North Carolina and South Carolina. He was professor of Diseases of the Eye and Ear in Leonard Medical School of Shaw University for Negroes; and Professor of Diseases of the Eye and of Hygiene at the University of North Carolina School of Medicine for seven years, while it was located in Raleigh.

Aside from activities in medicine and public health, Dr. Lewis was greatly interested in agriculture along modern scientific lines. He was the first in his section of the State to build a silo, about which he wrote and published a bulletin; also he was the first to use a cream separator, and in connection with

his farming he was active in securing good roads, especially for rural districts.

Upon his death on August 6, 1926, many organizations passed resolutions of respect and appreciation. Among them was that of his Negro neighbors of Oberlin, a suburb of Raleigh.

An estimate of Dr. Lewis by Dr. F. P. Venable of the University of North Carolina concludes as follows:

"The wonder grows as one thinks of the varied fields in which this man labored and his striking attainments. The marvel of it becomes still greater when it is realized from early boyhood he was handicapped by a physical infirmity which would discourage many others. His work, so wisely planned and so faithfully carried out, will long bear testimony of his unselfish and devoted service."

Years of Achievement

The Act of the General Assembly of 1909 providing for the employment of a State Health Officer for his whole time made it necessary for Dr. Richard H. Lewis, the father of the bill, to culminate 17 years of patriotic devotion to the health of the people of North Carolina. At a called meeting of the Board of Health on March 30, 1909, he explained the amended law, stating that he could not afford to surrender his practice and was therefore tendering his resignation. The Board, after insisting in vain for the withdrawal of the resignation, reluctantly accepted it. Dr. Watson Smith Rankin of Wake Forest was elected to succeed him on July 1, 1909, at a salary of \$3,000 per year.

At the meeting at which he resigned, Dr. Lewis was elected to serve on the Executive Committee of the Board, and upon motion of the Committee, was requested to act as Secretary until the end of June, 1909, when Dr. Rankin would take over. Also he was elected a delegate to the coming meeting of the American Public Health Association at Richmond and to the Conference of State and Provincial Health Authorities to be held in Washington.

Dr. Rankin was born in Mooresville, North Carolina, January 18, 1879; studied medicine at the North Carolina Medical College at Davidson for two years and received his MD degree from the University of Maryland in 1901. He then did graduate work at the Johns Hopkins University Medical School for one year. He was Professor of Pathology at the Wake Forest Medical School from 1903 to 1905, Dean of the School of Medicine from 1905 to

1909, and was Health Officer of North Carolina from 1909 to 1925.

Upon his acceptance of the post of Secretary of the State Board of Health, Dr. Rankin was authorized and requested to spend a month in investigating the practical methods pursued by the executive health officers of such states as he might select and in visiting the United States Hygienic Laboratory and the Bureau of the Census, his traveling and hotel expenses to be paid by the Board. During the first part of September he visited and inspected the administrative offices of a number of northern public health organizations, including the New York City Board of Health, the National Tuberculosis Association, the Lederle Laboratory, the Massachusetts State Board of Health, the Rhode Island State Board of Health, and the Bureau of the Census in Washington, D. C.

In taking over the work of the State Board of Health, Dr. Rankin stated his views on the policies and duties of the Board. He recognized the functions of the Board to be executive, advisory, and educational, the last two being the more important since the enactment and execution of health laws depend directly upon the education of the people. The executive function of the Board consists in the enforcement of all state health laws delegated to it by the General Assembly; these should control all conditions affecting the public health that are not limited to the jurisdiction of counties. Among these laws are the sanitary control of watersheds, the law requiring registration of births and deaths, sanitary supervision of state institutions, and the en-

forcement of quarantine.

When the General Assembly of 1909 made provision for the employment of a full-time state health officer, the Board had already achieved success in the prevention and control of contagious diseases. Quarantine regulations had long been established, though not always effectively enforced, under a system of local health administration. Basic health laws had brought safe water supplies and sewage disposal to most communities and certainly to the larger municipalities. Effective methods of sanitation had been introduced into state and local institutions, including hospitals, prisons and poorhouses; and, most important of all, great advances had been made in health education. These developments had already caused North Carolina to become recognized as a leader in public health work.

Dr. Rankin's task as full-time health officer was to coordinate and extend these activities and develop a board of health staff which would meet the ever-increasing demands of the people. He made health education the basis of the activities of the Board. The advice and assistance of the medical profession could be sought through the yearly conjoint sessions of the Board with the State Medical Society, where the work and needs of the Board were discussed. Through the *Biennial Reports* made to each session of the general assembly and through the monthly *Health Bulletin*, state and local officials and interested citizens could be informed of the Board's activities.

Dr. Rankin made his first annual report to the conjoint session held at Wrightsville on June 22, 1910. In this he reviewed the achievements of the past year, called attention to changes needed in public health laws, and gave his recommendations for the future.

The present enforceable state health laws, he pointed out, were as follows: (1) the registration of deaths in towns of 1,000 or more; (2) the inspection of state institutions; (3) the distribution of diphtheria antitoxin to the indigent; (4) the appointment of a county superintendent of health when this is not done by the county sanitary committee; (5) the control of public water supplies; and (6) governing the work of the State Laboratory of Hygiene.

Dr. Rankin regarded the most important achievement of his first year in office to be the continued and vigorous growth of public interest in questions of health. This was made evident in a number of ways. Fully 90 per cent of the work of the Board was of an educational nature, carried out through the *Health Bulletin*, articles published in newspapers, and public addresses. The state press had been most cordial in its cooperation, and many of the papers published the weekly articles on public health sent out by the Board. Public addresses had been made on sixty occasions; probably the most important were those arranged by Dr. J. Y. Joyner, State Superintendent of Public Instruction, to the Association of County Superintendents of Schools and to the North Carolina Teachers Association. In addition to lectures to teachers, Dr. Rankin had addressed the Federation of Women's Clubs and the State Press Association. Churches in all parts of the State deepened their interest in questions of health, and as a result Sunday, April 24 had been set aside for the discussion of sanitary problems. As a result of this educational movement, requests for the *Health Bulletin* made it necessary to increase its size and circulation.

Another indication of the spread of health education was that 45 of

the 63 public water supplies of the State had complied with the requirements of the State Board of Health by providing plans and specifications of their plants and adopting the rules and regulations prepared for the care of public water-sheds and plants. The State Laboratory of Hygiene made during the year 1,486 analyses of public water supplies, of which 5 per cent were considered bad. With few exceptions, these came from 9 of the 63 municipalities provided with public supplies - Highpoint, Wadesboro, Lumberton, Southern Pines, Mount Airy, Hot Springs, Hendersonville, Fayetteville, and Charlotte. Compared to the 5 per cent of the samples found polluted from the public water supplies, bottled waters showed 19 per cent bad and private family supplies showed 40 per cent bad. Wells with pumps showed pollution in 22 per cent while bucket wells had 56 per cent pollution.

Reporting further on the water situation, Dr. Rankin stated that the State Laboratory of Hygiene had made analyses of drinking waters sold in bottles or other containers. Some of these waters were being sold under labels which promised them to be cures for all affections of the kidney, bladder, alimentary tract, and liver; rheumatism, typhoid, malaria, and for skin diseases. The necessity for examining these waters was shown by the fact that of 61 samples from 29 springs, 37 of these were found to be infested with *B. coli*. In the case of three springs the analyses showed the presence of *B. coli* in abundance in every bottle and when the companies failed to improve the condition, the facts were published in the *Health Bulletin*. The result was a widespread effort, not only in this State, but in other states as well, to clean the springs and improve the bottling plants.

As to changes needed in the health laws, Dr. Rankin pointed to a great defect in the control of contagious diseases. At that time, quarantine was within the jurisdiction of the county superintendent of health. He could neglect to or refuse to quarantine until an epidemic was present. Under such circumstances the state was paralyzed. In this respect, particular attention was called to smallpox and Dr. Rankin went on record as opposing the present method of handling the disease, saying that quarantine gave a false sense of security, kept people from being vaccinated, and caused many cases to be concealed. Also, it cost the state from \$50,000 to \$60,000 per year.

Another needed change - diphtheria antitoxin was distributed by the State Laboratory of Hygiene for indigent cases when it was paid for by the county or town. Many cases occurred among indigent independent citizens who did not apply for free antitoxin although they were unable to pay for it. Dr. Rankin recommended that antitoxin be furnished to all citizens free of charge or at least furnished at cost.

The state's vital statistic law, passed by the General Assembly of 1909, had been in operation only since September 1909 when Dr. Creecy Wilbur, Chief Statistician of the United States Bureau of the Census, visited Raleigh in April 1910 and made an inspection of the death certificates filed with the Bureau of Vital Statistics. Although the North Carolina law applied only to towns of at least 1000 or more population, an aggregate population of 438,206 was estimated for the State as a whole. The death rate of these from January to April 1910 was 16.1. In the United States registration area of 17 states, the annual death rate for 1908 was 18.1 per thousand.

As a result of the extensive educational work carried on in the State, the General Assembly of 1911 enacted constructive legislation pertaining to public health. Many of the existing laws were amended so as to make them more practical and easier to enforce. The general appropriation of the State Board of Health was increased from \$10,500 to \$22,500; the maintenance appropriation of the Tuberculosis Sanatorium was increased to \$12,000, with an additional appropriation of \$20,000 for permanent improvements.

An important change was made in local health administration, county boards of health were established to take the place of the county sanitary committees. Each board was composed of the chairman of the board of county commissioners, the county superintendent of schools, the mayor of the county town, and two physicians selected by these three county officials to serve with them.

Quarantine was abolished against smallpox, while other quarantine laws were strengthened. An annual appropriation of \$1,000 was made to enable the Board of Health to contact manufacturers of high grade diphtheria antitoxin.

The new legislation enabled the State Board of Health to increase the circulation of the *Bulletin* from 11,500 to 20,000 copies per month; to develop close cooperation with the newspapers of the State by providing them with weekly press articles; and by increasing the number of pamphlets on disease prevention issued for free distribution.

In his report for 1911, Dr. Rankin discussed the work of the State Board of Health from the financial standpoint, pointing out the value to the State of the different divisions of work in contrast

with their cost. In addition to the direct appropriation of \$22,500 from the general assembly, the taxes collected for the examination of water samples by the State Laboratory of Hygiene amounted to about \$4,000, and the Rockefeller Sanitary Commission appropriated \$15,000 annually for work against hookworm disease in the State.

As to expenditures, the State Board of Health spent annually \$12,000 on its educational work. The Laboratory of Hygiene spent \$10,000 for assistants, apparatus, and supplies; for administering the Pasteur treatment; and for the distribution of diphtheria antitoxin. The Hookworm Commission received \$5,000 of the Board's \$26,500 which, with the \$22,000 appropriated by the Rockefeller Sanitary Commission, gave it an annual budget of \$27,000. The yearly expansion of the health work of the State was indicated by the total funds handled by the Treasurer of the State Board of Health. In 1909 these amounted to \$11,940.06; in 1910 to \$27,447.50; and in 1911 to \$46,128.79.

Dr. Rankin then pointed out concrete examples of how the State's investment in public health work pays large dividends. The Laboratory of Hygiene, for example, during the past biennium, in addition to 38,640 specimens examined for intestinal parasites, made 5,137 other microscopic examinations; 4,547 of these being water analyses. Pasteur treatment had been given to a total of 619 patients without a single death. Under the plan by which the State Board of Health purchased diphtheria antitoxin at the lowest cost, 6,932 packages were distributed. These five items alone amount to an annual saving of \$111,723 to the State. The cost of maintaining the Laboratory was an annual appropriation of \$2,000 from the legislature, plus approximately \$4,000 collected

annually as taxes from water companies.

Another example was smallpox. For the five years (1906-1910) the average number of cases in the State per year was in excess of 7,500, with an annual cost to the State of \$66,000. During the first year of the new law when smallpox was not quarantined, only 3,300 cases were reported, and the yearly cost to the State was only \$2,600. Attention was called also to other savings in terms of money as well as in the number of lives saved. For example, towns had savings by the law which requires specifications for proposed water supplies to be approved by the State Board of Health before being adopted by the town.

Attention was then called to measures which would enable the State Board of Health to carry on an adequate program. The first need was a law requiring the registration of births and deaths; the second was for an increase in the appropriation to meet the demands of the people for services from the different departments of the Board. The annual appropriation should be increased to at least \$25,000.

At the conjoint session held in Hendersonville in 1912, Dr. Rankin again called attention to the need for further legislation in regard to vital statistics. The law passed by the 1909 Legislature was inefficient in that it required death reports only from towns having 1,000 or more population. Because of the incomplete registration, the United States Census Bureau could not accept North Carolina as part of the national Registration Area. In this connection, attention was called to the fact that in North Carolina death-rates were likely higher in rural districts and, also, that North Carolina spent only one cent per capita on public health work. The State's estimated death-rate was

18.4 per thousand, while the average death-rate of the United States was about 15. Twenty-four states spent more than twice the amount spent per capita in North Carolina; fourteen more than three times; while eleven spent more than four times. In 1912, there were twenty states whose death rates were known. These were the states which had adequate vital statistics laws. Under conditions in North Carolina, with no complete registration of births and deaths, neither the people nor the State Board of Health could or did know exactly what was being accomplished by public health work. Without vital statistics a town, county, or state had no way of knowing how its death-rate compared with other places. It was necessary in public health administration to classify preventable diseases in their relative importance, for partially on that would depend the distribution of their forces in the fight against the different divisions of the foe.

Among other problems considered at the 1912 conjoint meeting was pellagra, which was being reported from many places in the South. In 1910, there had been 115 deaths reported from the registration area of North Carolina, while in 1911 there were 176 deaths or an increase of 52 per cent. The death-rate in the State was 47 per 100,000 or double the average death-rate of typhoid in the United States.

Attention had been called to pellagra at the 1909 meeting of the State Medical Society when Drs. E. J. Wood and Harlee Bellamy of Wilmington were appointed to study the disease in North Carolina. In 1910, Dr. W. S. Rankin reported a case of pellagra and a number of papers relating to the disease were read at the 1912 session. Among these, a paper by Dr. Wood entitled "Pellagra" gave the history and symptomatology and the effects of

the disease on the intestinal tract and the nervous system. As a result, Dr. Rankin suggested and was instrumental in having passed a resolution stating that pellagra was an interstate and not a state problem, and requesting the national government to deal with the problem as a Federal problem. This resolution, sent to the North Carolina representatives in Congress, was largely responsible for the success of the Honorable John M. Faison in securing from Congress an appropriation of \$45,000 for the study of pellagra.

The General Assembly of 1913 made a favorable record in health legislation. The most important action was the passage of a vital statistics law with an appropriation of \$10,000 for its enforcement. This law, to become effective on October 1, was an adaptation of the model vital statistics law prepared by the United States Bureau of the Census. It had, with slight modifications and revisions, already been adopted by twenty-five states having a registration law.

An important change was made in the title of health officials: a part time employee was to be known as the County Physician, while a full time employee was to be known as the County Health Officer. These designations were important since with the County Physician the people could not be led to believe that their county was doing health work.

The General Assembly also amended several sections of the existing health laws and raised the annual appropriation of the Board

from \$22,500 to \$40,500 annually.

In reporting the work for 1913, Dr. Rankin pointed out two areas for the State Board of Health to pursue in the future: (1) the organization of an efficient system of county health work; and he stated that plans were underway to secure the employment of a full time health officer in each of 10 counties by giving direct financial assistance, thus enabling the counties to develop uniform standards; (2) the adoption of a definite policy regarding tuberculosis, the cause of one-fourth of the State's preventable deaths. The first step in this direction was taken, when at an extra session of the 1913 General Assembly, the State Tuberculosis Sanatorium was placed under the management of the State Board of Health, which took over the operation of the institution the next year. This proved to be a difficult undertaking because of the institution's debts and the limited appropriation it received from the State.

As the demand for public health work increased, it became expedient for the State Board of Health to differentiate its activities into departments or bureaus. During the 1913-14 biennium, four new bureaus were established, making a total of six, which, in the order of their organization, were (1) the State Laboratory of Hygiene; (2) Hookworm Control and Sanitation; (3) Engineering and Education; (4) County Health work; (5) Vital Statistics; and (6) Tuberculosis Control and the State Sanatorium.

THE STATE LABORATORY OF HYGIENE

The State Laboratory of Hygiene was the first separate Bureau of the State Board of Health. It was organized in 1908 with Dr. Clarence A. Shore, Director. However, laboratory work had been carried on from the early days of the Board; the first such activity being the testing of samples of water in connection with the development of municipal water supplies. In fact, when the Board was reorganized in 1879, provision was made through the cooperation of the State University for making chemical analyses of water.¹ In 1895 two medical men, trained at the Hygienic Laboratory of the Marine Hospital Service in Washington, inaugurated bacteriological tests. In 1900, the State Board of Agriculture offered the assistance of its laboratory in the examination of samples from public water supplies. This work increased so rapidly that the General Assembly of 1903 made provision for payment of the service by authorizing a fee of \$5.00 for each analysis. In 1905, the legislature provided an annual appropriation of \$600 with which to establish a State Laboratory of Hygiene, but this amount was found to be insufficient and aid from the Department of Agriculture had to be continued. However, the General Assembly imposed an annual water tax of \$64 upon all public supplies. This supplemented the laboratory funds to such an extent that in 1907, when the annual appropriation for the Laboratory was increased to \$2,000, it became possible to employ a director for his full time. On January 1, 1908, Dr. C. A. Shore was elected Director and served until his death in 1933.

The Laboratory of Hygiene was first located on the third floor above a store on the west side of Fayetteville Street in Raleigh and remained there until 1917, when it was moved

into a newly constructed building of its own on Jefferson Street in the Hayes-Barton section of the city.² Owing to the rapid expansion of laboratory service, this building soon became inadequate, and the General Assembly of 1937 authorized the sale of \$160,000 in bonds to supplement a grant of \$130,909 from the Federal Public Works Administration, for the construction of a modern three-story laboratory building on Caswell Square adjoining the State Board of Health building. This laboratory completed in 1939, is known as the Clarence A. Shore Memorial Laboratory. In addition, a laboratory farm of 280 acres situated west of Raleigh is equipped with horse stables, small animal houses, and operating rooms. The preparation of biological products is carried out at the farm, and there are bred most of the small animals needed by the central laboratory.

Under the direction of Dr. Shore, the Laboratory of Hygiene had an ever increasing growth in the number of examinations made for the physicians of the State, and, from the beginning, there had been a steady increase in the examination of water and pathological specimens. The total yearly work more than doubled from 1909 to 1913.

In 1908, a "Pasteur Institute" had been established as part of the Laboratory of Hygiene, and persons exposed to rabies came from all

¹Zimmerman, Jane, "The Formative Years of the North Carolina State Board of Health". *North Carolina Historical Review*, Vol. XXI, No. 1, January, 1944, page 10.

²William A. McIntosh and John F. Kendrick, *Public Health Administration in North Carolina*, 1940, page 46.

parts of the State to receive prophylactic treatment. The attenuated virus used was obtained from the Hygienic Laboratory (now the National Institute of Health) of Washington until 1918 when the State Laboratory of Hygiene began to manufacture its own antirabic vaccine. By this time, there followed a marked decrease in the incidence of rabies and likewise in the number of antirabic treatments supplied.

In 1909, Dr. B. E. Reeves of Allegheny County called attention to the high price of diphtheria antitoxin and asked the State Board to consider the advisability of seeking legislation in regard to this. The Board for its part, in accordance with the authority given by the General Assembly, arranged to purchase antitoxin from the manufacturers at a reduced rate when it was used for indigent cases and when paid for by a county or a town. This antitoxin was distributed by the Laboratory of Hygiene, being sold to the counties at cost. The Legislature of 1911 appropriated \$1,000 annually to enable the State Board of Health to enter into contract with a manufacturing firm to supply the antitoxin. This enabled the State to supply reliable antitoxin at about one-fourth the original retail price; the manufacturers then cut their retail prices to meet the State's competition. The savings to the citizens of the State amounted to about \$30,000 annually. As a result, two years later in 1913, there was a decrease in the amount of antitoxin distributed by the State

Laboratory of Hygiene due to the, reduced cost at which it was sold by retail druggists. However, since there were many cases of diphtheria occurring among indigent independent citizens who do not apply for antitoxin, though they were unable to pay for it, the Laboratory of Hygiene arranged to furnish antitoxin to all citizens free of charge, or at least at cost.

The General Assembly of 1915 appropriated funds to enable the Board to purchase and distribute, either free or at a minimum of cost, certain other biological products such as tetanus antitoxin and the different vaccines. At the same session, an additional \$15,000 was appropriated for the construction of a biological laboratory. Later, in 1918, when the new biological laboratory had been completed, the State Laboratory began the distribution of diphtheria antitoxin made in the laboratory, at the cost of the package in which it was contained, whether the package contained 1,000 or 10,000 units. The new laboratory also provided facilities for the manufacture of smallpox, typhoid, paratyphoid, mixed typhoid, and pertussis vaccines; all of which were distributed free of cost.

For 1919, the Laboratory of Hygiene received from the State an appropriation of \$28,500 and collected in fees for special work for antitoxin, and in water taxes the sum of \$14,348.02; making a total of \$42,848.02 available. The value of the Laboratory of Hygiene's work to the State during the year was estimated at \$228,447.50.

THE BUREAU FOR HOOKWORM CONTROL

Dr. C. W. Stiles of the United States Public Health and Marine Hospital Service spoke before the State Medical Society in 1903, calling attention to the prevalence of hookworm disease throughout the South, (including North Carolina). His address made a profound impression upon the doctors present, and Dr. Lewis, Secretary of the State Board of Health, declared, "Dr. Stiles' visit to be an epic in the history of North Carolina and of the South."

As a result, the State Board of Health began a campaign to acquaint the physicians and the people with the facts about the disease. Literature was sent out. Dr. W. S. Rankin and Dr. J. N. Nicholson, working under the Board, demonstrated that the parasite was prevalent in all counties in the eastern part of the State.

A highly important event in the public health activities in the South was the announcement on October 26, 1909 that John D. Rockefeller had given \$1,000,000 to be used for the eradication of hookworm disease. On February 8, 1910, Dr. John A. Ferrell, County Superintendent of Health of Duplin County, was appointed Assistant Secretary of the State Board of Health to direct a Hookworm Commission to combat the disease. Upon taking up his duties, on March 12, 1910, Dr. Ferrell selected his field staff, and, by the middle of the summer, they had started on their task. The purpose of the work, as stated by the Rockefeller Sanitary Commission, was "to eradicate hookworm disease — to find the distribution, estimate the degree of infection, and to treat and cure individual sufferers, and most important to stop soil pollution." Throughout the South, the campaign was conducted through existing agencies. In North

Carolina, it was organized as a branch of the State Board of Health and conducted with the county as the unit.

The first step undertaken in North Carolina was to make a survey to determine where the disease was found and to estimate its intensity. This survey proved, however, to be more educational than practical. The plan was to send a field director to a county to visit schools and other institutions and, by personal inspection of children between the ages of 6 and 18 years selected at random by their symptoms, to estimate the number who had hookworm disease. "This very clinical diagnosis is checked up by occasional microscopic examination of specimens of stools for the eggs of the hookworm," to quote from an early report. At the time of the survey, local doctors were interviewed as to the number of cases they had treated in recent months.

It was soon found, however, that an accurate diagnosis of hookworm disease cannot be made by the mere inspection of the patient since there are other causes of anemia; and as relatively few doctors had treated the disease. This early method of making a survey was soon discarded. The estimate of the infection was then determined by the microscopic examination of specimens from at least 200 children.

Dr. Ferrell made his first report at the meeting of the State Medical Society on June 21, 1911. In this, he outlined the method being followed by the Commission. The State had been divided into districts. In each district, preliminary educational work would be conducted. Lectures would be given regarding

**Report of Rockefeller Sanitary Commission, 1910.*

hookworm disease and soil pollution, and there would be demonstrations with a microscope of the eggs of the hookworm and other intestinal parasites. Specimens of hookworms would be shown, and patients would be exhibited before and after treatment.

General educational campaigns were being carried out in the sixty counties which hold teacher's institutes to interest the citizens and physicians of those counties. Sanitary inspection surveys were being made of schools. Surveys of a number of counties had been completed.

By 1912, the dispensary method of conducting the campaign had been developed and was found to be so effective that it was soon adopted throughout the South. With this method, the first step was to visit a county and to obtain from the county commissioners an appropriation of from \$200 to \$300 to defray the county's portion of the cost of the campaign.

In North Carolina, boards of county commissioners met on the first Monday of each month. It was customary for the field director to spend several days, at least the preceding weekend, in the county to enlist the aid of prominent people who might be interested in health work and to meet the members of the board and explain to them, individually, the aims and workings of the campaign. In most counties, there was at least one member of the board of commissioners who had become acquainted with the work and was anxious to have the campaign come to his county. However, there were reactionaries. At one place, a member objected because he thought the money could better be spent in buying mules for the poorhouse farm. In another, in the county in which the State University is

located, a member was shocked at the idea of paying a doctor to treat worms. He contended that a certain number of worms was necessary to aid digestion, and, if they became too numerous, red oak bark tea would reduce the infestation.

Several weeks and sometimes months elapsed after an appropriation was obtained before the actual campaign was started, and usually it was a different field director who conducted the treatment work. The active campaign lasted five or six weeks. The first week was given to advertising and educational work. At the time the appropriation was obtained, the commissioners were asked to select five or more points in the county, and on one day of each week for five successive weeks or longer, a clinic was held at each selected place. Advertising consisted of placing large placards in stores, post offices, and other public places. Specimen tins were left at these places for distribution. Handbills describing details of the work — symptoms of the disease, how to prepare specimens, the methods of treatment, and the prevention of soil pollution were distributed far and wide.

During 1912, the Hookworm Commission continued highly successful work. Forty-one counties had made appropriations of \$9,450 for the local expenses of the campaigns. Work had been completed in 28 counties and was in progress in 5, with 8 others on the waiting list. An aggregate of 73,140 persons had been treated to date. The annual report of the Rockefeller Sanitary Commission gave North Carolina the leading place in tabulated results accomplished in ten Southern states. Also, North Carolina led in the percentage of local doctors and dispensaries treating hookworm disease; in the number of people examined and treated by local physicians; in the number of counties

making appropriation; and in the amount of money raised locally for cooperation with the Commission.

The dispensaries, even in counties having light infection, proved to be highly worthwhile because of their educational value. They gave an impressive demonstration of disease prevention; and the fact that other diseases, such as typhoid fever, dysentery, and infant diarrhea, so prevalent and so much feared in North Carolina at the time, are spread through soil pollution added to their educational value. As the work advanced, it became easier to get the people to submit specimens. All who came were examined, regardless of symptoms, and, as the Campaign progressed, not only the indigent, but others who were infected were given treatment.

The Bureau of Hookworm Eradication was directed in 1914 by Dr. W. P. Jacocks who reported that campaigns had been conducted in all of the state's 100 counties; but that the results of second dispensary campaigns held in 7 counties were disappointing. Because of this a new method of community work had been introduced. This consisted of placing a director and his assistant in a rural community of 20-30 square miles and with a population of 1,200 - 1,500 people, in which efforts would be made to examine all residents for hookworm disease, give treatment to those infected and have every home provide a sanitary privy.

The Bureau was terminated May 1, 1915. The work had begun March 1, 1910. During this time, 267,999 persons had been examined, this being more than one-eighth of the population of the State. Of those examined, 78,977 were found to be infected by microscopic examination, and 95,618 had been furnished treatment. This work cost the

counties \$20,394.96; the State \$15,119.11; and the Rockefeller Sanitary Commission \$68,653.28; — a total of \$104,167.35.

In the plan of community work which were begun in 1914, 15 communities, with a total of 369 square miles and a population of 11,378 persons (approximately one-half of an average county), was reached. In addition to the examination and treatment work, emphasis was placed on sanitation, and 1,796 improved privies were constructed at an average cost of \$10.90 for each privy.

Dr. Rankin, in his report to the State Medical Society in 1915, stated, "The influence of this work of the Hookworm Commission has been of great value in molding public sentiment favorable to the extension of public health activities along all other lines of sanitary endeavor."

The cooperative work for the control of hookworm disease marked the beginning of active public health work in North Carolina and in the South and led to the organization of departments of health and other agencies designed to control disease and improve the health and welfare of the people.

The hookworm campaigns were educational in character — a definite program was a means of educating the people in sanitation, personal hygiene, and disease prevention. A concrete demonstration is the most effective method of health education and those campaigns demonstrated that a widespread infectious disease can be prevented. More than this, the prevention of hookworm disease through sanitation prevents typhoid, dysentery, infant diarrhea, and other diseases found in warm climates. During the campaigns, facts about hookworm disease were carried to the people through

lectures and visits and public health literature, and from these they saw the results of treatment as expressed in the improved health of patients.

The campaigns brought great results from the standpoint of the community. The hookworm campaigns were conducted upon a cooperative basis and county authorities, as well as those of the State, were induced to appropriate funds for public health work, something they had never done before. Aside from benefiting the health of many individuals, the campaigns had a marked educational value and demonstrated that any local unit of government could, through sanitation, improve its conditions of health. This fact led to more efficient local health organizations and the provision of county departments with health officers employed full time. The hookworm campaign was indeed the forerunner of the system of county health work which has become the basic activity of state departments of health throughout the South and much of the nation.

A Bureau of County Health Work, under the direction of Dr. P. W. Covington, during 1914, gave assistance in the organization of campaigns for county health departments. By the end of 1914, eleven counties were employing full time health officers. The Bureau provided health literature and supplied pamphlets and multigraph letters to health officers.

The successful educational work conducted by the various bureaus caused the movement for organized public health work to spread to all parts of North Carolina. So favorable were the people to the movement that the General Assembly of 1915 increased the appropriation of the State Board of Health from \$40,500 to \$50,500 annually for 1915, and to \$55,500 for 1916. An additional appropriation of \$15,000 was made for the Laboratory of Hygiene. This increase was made to enable the Board to produce and distribute either free or at a minimum cost certain biological products such as diphtheria antitoxin, tetanus antitoxin, and the different vaccines, particularly typhoid vaccine.

THE BUREAU OF RURAL SANITATION

The Bureau of Rural Sanitation, organized on May 1, 1915, to carry on the work initiated by the Hookworm Commission, was directed by Dr. G. M. Cooper, former Superintendent of Health of Sampson County. The aim of the Bureau was to develop local self-government in rural sanitation throughout the State. To create interest in such work a unit plan was devised to induce counties to begin cooperation with the State Board of Health as a means of interesting them in introducing full-time health work. With full-time work, the county does its own health work, while, with the unit plan, the county would pay the State Board of Health to do its health work.

The method of the unit plan was to select an important health problem of a county and have the State Board attack it with its own officers, following a definite plan previously agreed upon. The State, of course, employed men trained in the work of the specified unit. In arranging for such a unit, the Bureau prepared a budget which was submitted to the county authorities who must in turn agree to pay the actual cost of the project.

Prevention of typhoid was the most popular unit. It was carried out by having a movable dispensary visit the county for six or more weeks to give vaccinations against typhoid. The average cost of this unit was about \$325. Another unit, school inspection, usually cost \$450, half of which was paid by the school board and half by the county commissioners. The program of the school unit was to organize a special health day in each school community; assist the teachers in introducing the principles of health and sanitation to the community; inspect the pupils for common de-

fects, and notify their parents regarding these; and to give lectures (illustrated) on school health. The sanitation of the school was emphasized, and an effort was made to have each school provide safe drinking water and sanitary privies.

Six counties provided for the school unit during 1915, and ten counties made application for typhoid vaccination to be carried out during the summer. Plans were made to provide other units of work — a Life Extension Unit and a Maternity and Infant Welfare Unit, for example.

The cost of employing a full-time health officer involved a greater outlay of funds than the average county was prepared to provide for this facility. Because of this, the optional units of health work supplied by the State Board of Health were requested by many counties. This was particularly true of typhoid vaccination which was conducted during the summer months by doctors from medical schools and those on holiday leave.

During 1915, typhoid vaccination was carried out in twelve counties where more than 52,000 people were given complete vaccination (3 doses), and many others had one and two doses each. In 1916, 48,000 were vaccinated in 12 counties. Also, much educational work was carried out. The twelve counties reached in 1914 had 175 deaths from typhoid fever, while in 1915, a year later, they had only 132 deaths. During this year, the counties appropriated \$6,500 for this work.

The campaign against typhoid continued during 1917, but was hampered by the difficulty in securing medical officers since many doctors and nurses were entering the Army and Navy. However, 30,000

persons were vaccinated by the unit, and thousands of others by their physicians; the vaccine being supplied in all cases free of cost by the State Laboratory of Hygiene. The 1918 and 1919 typhoid vaccination campaigns were carried on during the summer months using third year medical students, since doctors were not obtainable. A total of 49,076 persons in 20 counties were given complete vaccination. The campaigns continued in eight counties during 1920. Also, there were cooperative campaigns in three counties in which the county supplied the working personnel; a total of 29,499 complete vaccinations being carried out during the summer.

The Medical Inspection of Schools Unit, organized and directed so successfully by Dr. Cooper, attracted attention throughout the State and the South. Emphasis was placed on the treatment of pupils found to have defects which handicapped them in their school work. Dental defects were the most prevalent, and free dental clinics were organized and held in schools and at other dispensary points when schools were not in session. Dentists, provided with portable outfits, conducted the clinics, and each child had his teeth examined and cleaned, and, when needed, extractions and fillings were done. The clinics were attended by the parents as well as the children. In fact, no child was treated unless a parent or guardian came with him. This made the lectures and demonstrations on oral hygiene all the more effective, and, as a result, local dentists reported an increased number of adults as well as children coming to them for

treatment.

One of the early dentists to engage in the program was Dr. Ernest A. Branch. The careful manner in which he handled the children and secured their cooperation set an example for the others of the staff. So successful was his work that when the demand for school dental clinics became widespread and a separate Division of Oral Hygiene was organized in 1931 as part of the State Board of Health, Dr. Branch became one of its early directors; and oral hygiene continues to be an important part of the State Board of Health's school program. As a result of this remedial work, along with education in dental care, aching teeth and foul mouths have become the exception in North Carolina schools.

Another feature of the school inspection unit initiated by Dr. Cooper was the treatment of diseased tonsils and adenoids at what were called "Adenoid and Tonsil Clubs". The services of recognized specialists, assisted by one or more trained nurses, were secured. These would visit a school or community where a club had been organized, the clinic being held in the schoolhouse or some other place which could be converted into an emergency hospital. The men and women of the community would volunteer their help, and, on an average, the surgeon would perform 16 operations in one day. The local doctor acted as anesthetist and had charge of the clinic during the 24 hours the children remained after their operations. The cost of holding such a clinic averaged about \$175. This amount was paid by parents and friends of the patients.

THE EXECUTIVE DEPARTMENT

In addition to having supervision of the different departments (bureaus) of the State Board of Health, the state health officer has direct charge of the executive work of the Board. This work Dr. Rankin divided into (1) the formulation of policies and the inauguration of new activities; (2) supervision of other directors of the executive staff; (3) the handling of matters of general concern that cannot be referred to divisions responsible for special work; and (4) receiving and disbursing the funds designated for the work of the Board. An important part of Dr. Rankin's work was to present the needs of the State Board of Health to the General Assembly in order to secure appropriations.

Examples of the inauguration of new activities are the unit system of county health work which began in 1911 and developed so rapidly that by 1916 it had become applicable to 95% of the counties of the State.

During 1916, the executive officer interested the Federal Children's Bureau in the North Carolina unit plan, and, without cost to the State, this Bureau undertook to develop units of Child Hygiene work in Cumberland and Swain Counties. Also, the United States Public Health Service placed a member of their medical staff in Edgecombe County as full-time health officer to develop and establish a model plan of county health work. Dr. K. E. Miller was detailed for this study, and he took up work in February, 1917.

Dr. Joseph H. Pratt, Chairman of the North Carolina Highway Commission, approved plans suggested by the State Board of Health with rules and regulations for the hygienic care of prisoners and the

sanitary management of prison camps.

A system for the optional regulation of sanitation of hotels was developed. This included official grading and publication of grades and was put into effect on June 1, 1916.

In cooperation with the State University, a plan was arranged to make post-graduate medical education available to the doctors of the State. The State Board of Health working with the Medical School and the Extension Bureau of the University, in 1916, initiated a series of short courses offered by medical specialists in cooperation with physicians in hospitals of closely grouped towns. The first series was attended by 169 doctors, and the plan was so successful that it is still being continued.

By 1919, in addition to 10 counties then cooperating with the State Board of Health, there were others willing and anxious to provide for full-time health department work and called on the Board to supply them with trained doctors and nurses. At the time, however, there was no school in the State or in the South for that matter where special training in public health work could be obtained. This led Dr. Rankin to propose early in 1919 that courses be organized at the University, at the State Tuberculosis Sanatorium, at the State Laboratory of Hygiene, and at city and county health departments through which public health officers and nurses and sanitarians could secure inservice training. The object was to educate public health workers through a year of study and field work. The proposal contemplated the provision at Chapel Hill of an incinerator and a pasteurization plant, as well as a community labo-

ratory so that training in sanitation and milk and water inspection could be taught. This training was to be carried out under the supervision of the State Board of Health by the physicians of the Tuberculosis Sanatorium, the staffs of the University School of Medicine, and the State Laboratory of Hygiene. The in-school program was to be conducted during the fall, winter, and spring months, and the field work during the summer months.

The proposal met with opposition and was rejected by the University for a number of reasons: lack of funds for the biennium of 1919-20 made it impossible to secure the equipment required; however, lack of funds was not the only cause for rejection of the proposal. One objection voiced, and that by the head of the Department of Zoology, was that the University,

by taking part in such a "make-piece" school of public health might become the laughing stock of such great universities as Harvard, which, at that time, already had a school for health officers. "What," he asked, "would the Hopkins think if the University undertook to offer a course in protozoology?"⁴ The staff of the *medical department* also were not enthusiastic, claiming that they were already overworked. However, an improved health program was put on at the University and in the town of Chapel Hill. A health officer for Orange County was secured in September, 1919, and, also, a city health officer began work with emphasis placed on sanitation and the care of student health. Such a program for the State as a whole, however, did not materialize at the time, and the University did not participate until the Department of Public Health was established in 1936.

⁴Wilson, Louis R. *The University of North Carolina, 1900-1930*. University Press, Chapel Hill, c.1957. pages 570-572.

THE STATE SANATORIUM FOR TUBERCULOSIS AND THE BUREAU OF TUBERCULOSIS

At the 1905 meeting of the State Medical Society, the President appointed a committee to consider the advisability of organizing an association to combat tuberculosis. The following year, at the meeting of the Society held in Charlotte, May 30, 1906, the committee met and organized such an association, adopted a constitution, and elected the following directors: Drs. M. L. Stevens, Asheville; R. H. Lewis, Raleigh; J. Howell Way, Waynesville; G. G. Thomas, Wilmington; J. M. Parrott, Kinston, Charles A. Julian, Thomasville; W. S. Rankin, Wake Forest; and Albert Anderson, Wilson. Dr. Stevens was elected President and Dr. B. H. Hays, Secretary. This committee consisted of a group of the ablest and most influential doctors of the State.

The second annual meeting of the Association was held in Morehead City, June 12, 1907, twenty members being present, and the same officers were re-elected for another year. At the third meeting, held in Winston-Salem, Dr. W. L. Dunn of Asheville was elected President, and Dr. C. A. Julian of Thomasville was elected Secretary.

The Association had the sanction of the State Medical Society, and its activities influenced the General Assembly of 1907 to pass an act for the establishment of a sanatorium for the treatment of tuberculosis.

Under this Act, the General Assembly appropriated \$15,000 for the erection of a Sanatorium for the Treatment of Tuberculosis, with \$5,000 annually for its maintenance. Chief credit for its establishment is due to Dr. J. E. Brooks of Greensboro, and the Honorable J. R.

Gordon, M.D., member from Guilford County in the House of Representatives. Dr. Gordon was the first President of the Sanatorium board of directors, and Dr. Brooks was selected to be Superintendent of the proposed hospital. The institution was built near Montroes in Hoke County and was opened in November, 1908 with a capacity of 34 patients.

On April 19, 1909, Dr. C. A. Julian, Secretary of the North Carolina Association for the Prevention of Tuberculosis, made an inspection of the Sanatorium and submitted a highly adverse report. Among other things, he reported that there were no regular attendants, and the doctor in charge came from Aberdeen and did not remain at the institution except for a few hours each day. The beds were in disorder and the sheets dirty. Flies abounded in the kitchen and dining rooms as well as in the wards; there were no screens. There was no laboratory equipment, and the patients had no care. As to food, there was no regular milk supply, and the butter and eggs, ordered from Aberdeen, were often stale upon arrival.

Dr. Rankin, soon after he became State Health Officer, made an inspection of the Sanatorium in July, 1909. He found the institution in an unsatisfactory condition. While his report was not so critical as was that of Dr. Julian, he pointed out a number of changes urgently needed; both as regards equipment and management.

On August 10, 1909, a called meeting of the Executive Committee of the State Board of Health was held to consider conditions at the Sanatorium. Dr. Gordon, President of the Board of Directors, appeared

before the Committee to explain Dr. Julian's report. He said, "The whole thing in a nutshell is this; the Board of Directors in their zeal to demonstrate to the Legislature the good that could be derived from the institution, permitted the institution to be opened before it was properly equipped — that is, before we had an institution. That was a mistake made, and we feel that the members of the Sanatorium Board realize that now. At the same time, we thought it would help us in getting additional appropriation, without which we could not have continued the work."

Col. J. L. Ludlow, the engineer member of the Board, made the following resolution which was passed: "Recommend to the board of directors of the institution that it shall not be opened for the treatment of patients until the contemplated improvements have reached such a state that the patients entering can be properly cared for."

In 1909, the General Assembly increased the maintenance appropriation from \$5,000 to \$7,500 a year with an additional \$30,000 for two years for permanent improvements. And in 1911, the maintenance appropriation was increased to \$12,500 with \$20,000 for permanent improvements.

The extra session of the General Assembly, meeting in the autumn of 1913, placed the Tuberculosis Sanatorium under the direction of the State Board of Health, and Dr. L. B. McBrayer, a leading tuberculosis specialist of Asheville, consented to head the institution and direct a Bureau of Tuberculosis. He took charge on January 1, 1914, and at once began a survey to determine the amount of tuberculosis in the State. From this he estimated that there were from 15,000 to 18,000 cases of active tuberculosis

in North Carolina; of which from 7,000 to 10,000 were white and that at least 2,000 of the 7,000 were unable to secure proper treatment. Among the Negroes, the number of cases unable to secure proper treatment was much higher. These findings, Dr. McBrayer declared, showed that the problem was bigger and heavier than the State government could carry alone. To meet with success, the burden must be shared with counties, towns, and industrial, social, and religious organizations. The State had already supplied a sanatorium; other organizations must endow beds, erect and endow cottages at the Sanatorium. Any attempt at the effective management of the tuberculosis problem must make prevention its aim and cure an incident. The Sanatorium is an agency of prevention, primarily, and of cure, secondarily. It should become a training school where tuberculous patients are taught to care for themselves and learn how to keep from infecting others.

The financial arrangement established was for the patients or the friends or organizations sending them to the Sanatorium to pay \$1.00 per day which would cover all the expenses of a patient while in the institution.

The Bureau of Tuberculosis, with headquarters established at the Sanatorium, had the duty of enforcing the law requiring that all cases of the disease be reported and to reach these cases through a correspondence school and through unofficial letters and suitable literature.

The General Assembly of 1915 enacted legislation permitting county commissioners and towns and cities to appropriate money for the support of tuberculous citizens in the Sanatorium. Also, it provided \$60,000 for the payment of debts incurred by the Sanatorium before

it was turned over to the State Board of Health and for permanent improvements. The annual maintenance appropriation was increased from \$20,000 to \$25,000, and, in addition, \$10,000 was granted for educational work.

By 1916, Dr. McBrayer reported, the Sanatorium and the Bureau of Tuberculosis was making great progress in reaching the tuberculous patients of the State. More than 200 patients a year were being admitted, and this number was expected to increase to 350 to 400 with the recent opening of the new building. The patients being admitted were: 25 per cent incipient, 43 per cent moderately advanced, and 32 per cent far advanced. When discharged, the patients were 24 per cent arrested, 9 per cent apparently arrested, 28 per cent quiescent, 30 per cent improved, 4.5 per cent unimproved, and 4.5 per cent deceased. Also, the Sanatorium was examining about 310 out-patients each year.

The law enacted by the General Assembly of 1917, requiring the reporting of infectious diseases, markedly increased the number of cases of tuberculosis reported. In 1918, there were reported 5,765 cases which meant that there were probably 15,705 clinical cases (5 for each death) of the disease in the State. Of the cases under treatment, from 60 per cent to 70 per cent were reported cases. As a result, educational contact was made with the 5,765 homes of patients plus the homes of 3,141 who died.

In 1916, the Metropolitan Life Insurance Company arranged to assist the Sanatorium by the part time use of their field nurses in public health work. This became an effective branch of the Bureau. Probably the first such nurse to be employed in this way in North Carolina was Miss Mabel Sandwith, an

English girl working in Rocky Mount.

Special education work was organized among the Negroes of the State. Their death rate from tuberculosis in 1918 was 218 as compared with 101 for whites. Mrs. Florence Williams, a colored nurse, former teacher, and county supervisor of schools, was employed to organize health leagues in Negro communities having large populations.

During 1919-20, a daily average of 125 patients was treated at the Sanatorium; 1,013 were examined and given advice; 250 were discharged practically educated on the subject of tuberculosis; correspondence was carried on and literature sent to 2,719 homes from which cases had been reported. And the General Assembly of 1919 appropriated \$100,000 for general improvements.

There was a total of 3,710 deaths reported from tuberculosis in 1915; the number dropped to 3,517 in 1916, to 3,402 in 1917, to 3,391 in 1918, and to 3,005 in 1919.

By 1922, interest became aroused in county tuberculosis programs which included the building of county sanatoria. This interest increased so much that by 1939 there were 16 county tuberculosis sanatoria in the State; providing a total of 825 beds — 514 for whites and 311 for colored. In the State, there were approximately 1,500 beds for whites and 400 for colored or about one bed per annual death from tuberculosis. In addition, a number of counties provided custodial care for tuberculous patients at county homes.

In 1923, the General Assembly provided for an Independent Board of Directors for the Tuberculosis Sanatorium removing the direction of the institution from the authority of the State Board of Health.

THE BUREAU OF ENGINEERING AND EDUCATION

For many years, the State Board of Health, with the advice and assistance of its engineer members, carried out sanitary engineering measures as part of its general program. As time passed, the need for a specialized engineering service became more apparent. To meet this need, a Bureau of Engineering and Education was organized in 1910 with Mr. Warren H. Booker as Director. Mr. Booker, a civil engineer by profession, had been connected with the Ohio State Board of Health. His work would be mainly in connection with the enforcement of regulations regarding public water supplies and sewage disposal and in directing the Board's educational program. The influence of this Bureau on the progress of health work in North Carolina was early recognized.⁵ Publicity of health measures was carried on by the publication and distribution of the *Health Bulletin*, the preparation and distribution of other health literature, and by supplying newspapers with popular weekly articles on health subjects. By 1915, the *Health Bulletin* reached a monthly circulation of 47,000, and 31 daily and 40 weekly papers of the State were being supplied with news articles relating to health topics.

Another popular feature of the Bureau's program was the travelling health exhibit prepared by Mr. Booker. This was shown at the American Public Health Association meeting in Jacksonville in 1913 where it attracted wide-spread attention. In the State, it was shown at county fairs and later, in 1914, at the State Fair in Raleigh. It is estimated that above 100,000 persons saw the exhibit during the year.

Another important service of the Bureau was the preparation of sets of lecture material — a lecture outline for tuberculosis, for typhoid,

and for other widespread diseases in North Carolina, along with 50-75 slides with which to illustrate each lecture. These outfits were loaned to anyone willing and able to use them, and they were largely used by health workers, teachers, preachers, and others interested in community health. Placards on health subjects such as typhoid, tuberculosis, flies, and careless spitting were prepared for posting in post offices, mills, shops, stores, and other public places.

Up to 1914, the Bureau gave assistance to 33 towns and cities in the installation and conduct of their public water supplies and sewage disposal plants. During 1915 alone, studies were made of and approval given to eight sets of plans for municipal water plants; 15 plans for sewage disposal; and studies were made of 125 watershed inspection reports.

To the education equipment of the Board there was added, during 1916, a moving picture outfit. This consisted of an automobile delivery truck equipped with electric generators to operate a moving picture projector, and the best available films on sanitation and hygiene were shown. The outfit could be taken to any country school and a moving picture health show given at places and communities which had never before seen moving pictures.

The monthly circulation of the *Health Bulletin* reached 51,000, and about 350,000 pieces of other public health literature were distributed. However, in 1915, because of conditions brought about by the European War, funds for State printing by the Board were cut short, but,

⁵ As I Recall, by B. E. Washburn. The Rockefeller Foundation, New York, N. Y. c. 1960.

through the cooperation of the Metropolitan Life Insurance Company and Colgate and Company, pamphlets on various diseases were supplied and distributed by the Board. The press service of the Bureau was continued, however, and the weekly material was sent out as usual.

The engineering work of the Board had to be suspended in September, 1918 when Mr. Booker, who had been the efficient Director of

the Bureau of Engineering and Education for seven years, resigned to go to France to engage in tuberculosis work with the American Red Cross. Between September, 1918 and April, 1919, engineering problems were taken care of by the engineer member of the Board, Colonel J. L. Ludlow. Then Mr. H. E. Miller, a graduate engineer of the University of Michigan, was placed in charge of a new Bureau of Engineering.

THE BUREAU OF VITAL STATISTICS

The work of the Bureau of Vital Statistics consists of collecting, classifying, and recording the births and deaths of the State. The Bureau was established on July 1, 1913, with Dr. J. R. Gordon as Director. The need for such a department was recognized early in the history of the State Board of Health. In 1881, the General Assembly, in deference to the demands of the Board for vital statistics legislation, passed an act providing for the collection of vital statistics at the annual tax listing. The regulation of common carriers came in 1893; the establishment of a State Board of Embalming in 1901, with representatives of the State Board of Health on its membership; the enactment in 1909 by the General Assembly for the collection of vital statistics in towns having a population of 1,000 or more; and, finally, the passage of the vital statistics law in 1913 with an appropriation of \$10,000 for its enforcement.

Upon the establishment of the Bureau of Vital Statistics in 1913, the Director spent the remainder of the year in organizational work; securing the appointment of 1,400 local registrars by the boards of county commissioners; forms and literature were prepared; and doctors, and midwives, and undertakers were listed. The work got off to a successful start, and during the first four months of 1914 practically complete returns were made by 24 counties, while sixty counties had complete birth registration.

In 1915, the General Assembly made the vital statistics law conform with the National Model Law, burial permits being required in rural as well as in urban communities. North Carolina was admitted to the United States registra-

tion area for deaths in 1916, and for births in 1917, the Bureau of the Census having found after investigation that birth registration was 96 per cent complete.

The vital statistics law became legally effective on October 1, 1913. North Carolina was the 26th State to require registration of deaths and the 14th State to require the registration of births. In January, 1917, when North Carolina was admitted to the registration area, the death rate was 13.3; being less than the average for the registration area of the United States. Also, North Carolina had the highest birth rate of any State — 31.5.

Under the direction of Dr. Gordon, the Bureau of Vital Statistics soon became recognized by the physicians of the State as necessary in the development of disease control measures; and by local officials for progress in civic affairs. During the first five years of its existence, up to 1918, it was conducted so as to meet the standards set by the Bureau of the Census — that is, obtaining 96 per cent of reports of births and deaths. In 1918, the death rate of North Carolina had dropped to 13 per thousand population as compared with 14 per thousand in the registration area of the United States. The birth rate was 31.9 per thousand population, this being the highest state birth rate in the nation. In North Carolina, the white death rate was 11.2 and the colored was 17; the white birth rate was 32.2 and the colored 31.1.

Dr. Gordon was Director of the Bureau from 1913 to 1919 when he resigned because of ill health. He was succeeded by Dr. F. M. Register who served until 1930.

THE DEVELOPMENT OF COOPERATIVE HEALTH DEPARTMENTS IN NORTH CAROLINA

North Carolina was a pioneer in the development in both number and quality of county health departments. Many other states had proceeded through the setting up of city health departments. The Jefferson County Health Department set up in Kentucky in 1908 was just an extension of the Louisville City Department. Guilford County, North Carolina began in June 1911 and Yakima County, Washington got underway a month later. Robeson County, North Carolina started the first strictly rural county health department in 1912 and in 1913 five other counties began this service: - Buncombe, Durham, Forsyth, New Hanover, and Sampson.

In 1915-16, the growth of public health work brought about an ever increasing demand for trained medical personnel. This was especially the case in North Carolina where campaigns against hookworm disease had been followed by community demonstrations. By 1914, eleven counties had employed full-time health officers who worked without any connection with the State Board of Health; and, in most cases, inadequate provision had been made for necessary equipment or for assistance. However, great good resulted from an educational standpoint from the efforts of these pioneer health officers.

The program of work carried out in these counties was similar to that conducted in Nash County during 1914; there work began in April, and the health officer was the sole member of the staff. His office was in the grand jury building on the lot adjoining the courthouse. A microscope, a magic lantern, and office furniture were supplied, and there was a small fund for contingencies such as stationery, printing,

and postage. Travel expenses of the health officer were included in his yearly salary of \$2,500.*

The health officer was left to his own discretion as to what work he would carry on, his only specified duty being to give medical attention to the inmates of the county home and jail. However, it was not difficult to formulate a worthwhile program; further examinations for intestinal parasites were indicated by the findings of the dispensary campaign, and typhoid and smallpox were the two most dreaded diseases of the county at the time. Their prevention was facilitated by the fact that the State Laboratory of Hygiene supplied vaccines for both diseases free of cost. Along with this indicated program, medical inspection of children for defects which deterred their progress in school, and quarantine against infectious diseases were undertaken.

Probably the most important part of the first year's program in Nash was the educational work. Its success was due in large measure to the cooperation of the teachers, directed by Mr. Oscar Creech, the County Superintendent of Schools who took an active part in an effort to organize each school into a community health center. Clean-up campaigns which were organized at the schoolhouse were extended to many of the homes of the district. As a result, during the summer, sanitary privies were provided at all the schools in the county and at many homes. At the Teachers' Institute held in Nashville during the summer, lectures were given, and the ordinance requiring vaccination against smallpox was explained.

* *Ibid.*, page 16.

The demand for health officers and especially for sanitary inspectors made it desirable for the State Board of Health to provide a training center with a program which included more than the prevention of soil pollution. As a result, the Board requested and obtained the cooperation of the International Health Board in a plan to develop a three-year program of county work which would serve as a demonstration to other counties and at the same time provide a suitable training center for county health workers. The International Health Board, for its part, wished to establish a training center for doctors who were planning to go into its service. As in other programs in which this Board cooperated, part of the cost of the demonstrations was to be paid by the county.

As planned, for the first year at least, the program was to follow the methods used in the community demonstrations; a health worker would be placed in a school district or a community in each township for as long as was necessary for every home to be visited. The people were to be examined and treated for hookworm disease and the family encouraged to build a sanitary privy and provide a safe water supply. In this way, model health communities would be developed which would serve as demonstrations to other parts of the county.*

During the first year, as a means of securing cooperation anti-typhoid vaccination was to be given. However, it was to be pointed out with emphasis that the vaccine provides only temporary protection and was not a substitute for sanitation in the home.

So great had become the enthusiasm for rural health work among central office personnel that a belief had developed that if an ideal program could be devised and carried

out, this would be so striking as to act as leaven and cause adjoining counties of their own accord to initiate and carry out similar programs. Officers of the United States Public Health Service were reported to hold this view as were also some of the directors of the International Health Board. The idea, however, was not shared by field workers.

The source of funds for this demonstration program was: State Board of Health \$150 per month; International Health Board \$300 per month; County \$300. This \$750 per month provided the salary of the medical director - \$150; salaries for six field assistants - \$450; office assistant - \$50; drugs, supplies, equipment - \$50. Wilson County in the north central part of the State made an appropriation for this first year of soil pollution control, which was later to be developed into a county health department. The Town of Wilson provided space in the city hall for the central office and laboratory, and the demonstration work began September 1, 1916, with Dr. B. E. Washburn, of the staff of the Rockefeller Foundation, as County Health Officer.*

Wilson County had already had a successful hookworm campaign in 1912, followed by the optional units of school inspection and typhoid vaccination. As organized, the campaign was to use the methods followed in the community demonstrations; however, each township was to be considered a community in order that the entire county might be reached.

Wilson proved to be an excellent county in which to carry out a demonstration in public health work. The county was prosperous; its leaders were progressive, and the people

* *Ibid.*, page 145.

* *Ibid.*, page 17.

were for the most part cooperative. There was an active chamber of commerce, and farm and home demonstration agents were conducting programs in all parts of the county. The *Daily Times* was most generous in the publicity it gave the campaign. Throughout the county, there were local clubs eager to help in any work for community improvement. Mention must also be made of the members of the County Medical Society who gave their support, and in the smaller towns the doctors took the lead in making the campaign a success. Among prominent leaders who did much to aid the campaign was Mr. Charles L. Coon, the County Superintendent of Schools, a State leader in the field of education, under whose direction the Wilson schools were being improved to make the best in the State. He was especially interested in health education among the Negroes and insisted that every Negro school be visited; and he accompanied the medical director on many of these visits.

As planned, the soil pollution unit was to be conducted only in rural sections of the county and no work was contemplated in the Town of Wilson; however, it was soon found that attention had to be given to the town if the rural campaign was to succeed since the large cotton and tobacco farms were owned by people living in the town, and in order to get cooperation in sanitation in the rural homes, it was necessary to reach and impress the owners regarding the importance of correcting poor sanitary conditions.

The staff of the unit which, early in the campaign, had become known as the "Wilson County Health Department" was asked by the Women's Club to assist in a sanitary survey they were making to determine the cause of the high incidence of typhoid and diarrhea which occurred every summer. The

death rate of the Town was 20.5 per thousand population as compared with 12.4 for the State and more than one-third of all deaths were from preventable diseases — mainly tuberculosis, infant diarrhea, typhoid, and dysentery.

The report of this survey showed that of the 2,126 homes in the Town, only 518 had sewer connection, although one-half of the Town was in the sewer district; while 1,608 were provided with open-back surface closets. There were 301 homes in the sewer area which were not connected but used open closets, while 121 with sewer connections also had open closets for their servants. There were 1,239 open wells in the City. *

To remedy the situation, the Town authorities were induced to pass an ordinance requiring every home within the sewer area to connect, and every home not connected with the sewer to be provided with a sanitary closet. A full time sanitary officer was placed in charge of the city department of sanitation.

Practically every rural home in Wilson County was reached during the first year of work; and demonstrations had been given in every school, and talks had been made at churches, Sunday Schools, and before community clubs, veterans associations, and other organizations.

During the Wilson campaign, a group of medical men selected for the staff of the International Health Board came for training, and during their stay rendered valuable assistance in carrying out the soil pollution unit. Among these were Dr. G. K. Strode, who later became Director of the International Health Board; Dr. J. L. Rice, who was later Commissioner of Health of

* *Ibid.*, page 129.

New York City; and Dr. W. G. Smillie, who organized cooperative work in Maryland before becoming Assistant Director of The School of Hygiene in Sao Paulo, Brazil, and later Professor of Public Health Administration at Harvard and later in the Cornell University Medical College. Among these doctors in training was a near poet, Dr. A. C. Pfeiffer from Michigan. He made clever rhymes about incidents connected with the campaign. One of the most appropriate concerned the task of getting rural home to sanitation. The closing stanza admirably summed up the problem of rural sanitation as follows:

Keep combing the landscape
with Dodge and with Ford,
Keep preaching to all the un-
grateful horde
Who pretend to heed what you
have to say —
But always tomorrow, never
today. *

The growing interest in improving sanitation, especially in rural districts, was shown by visits made to the Wilson County Training Center by health workers from other North Carolina counties and from other states. Several counties sent committees from their boards of health — among these being Nash, Lenoir, Vance, and Davidson. As a result of this increased interest in local health work, Dr. Rankin, the State Health Officer, was able to secure from the General Assembly of 1917 an appropriation of \$15,000 with which to assist county health departments. This \$15,000 was supplemented by funds from the International Health Board to provide for a Bureau of County Health Work through which the three year program under way in Wilson could be extended to ten counties.

Since all ten townships of Wilson County had been reached by April, 1917, steps were taken to organize an adequate county health

department which would maintain and further develop sanitary improvements in both the town and the county. At their June, 1917 meeting, the Wilson County and Town Boards of Commissioners made the appropriation for Wilson County to join the State plan. Dr. J. C. Braswell was selected as full-time health officer; he accepted and took up his duties the first of July.

The movement for public health work reached such a high level in 1917 that the General Assembly of that year passed a number of important measures that broadened the scope of the work of the State Board of Health. The most important were "to prevent and control the development of certain infectious diseases; to provide for the physical examination of the school children of the State at regular intervals; for the cooperative and effective development of rural sanitation; to prevent blindness in infancy; to provide for the sanitary inspection and conduct of hotels and restaurants; and to regulate the hygienic handling and work of prisoners." To carry out the provisions of these acts, the annual appropriation of the Board was increased to \$60,772.16; and the income of the State Laboratory of Hygiene amounted to \$21,587.22.

To put into effect the new provisions enacted by the General Assembly in 1917, it was necessary to make a number of changes in the staff of the State Board of Health. A Bureau of Epidemiology was created with Dr. A. McR. Crouch as Director; a Bureau of Medical Inspection of School Children was established and directed by Dr. G. M. Cooper. A Bureau of County Health Work with Dr. B. E. Washburn as Director replaced the Bureau of Rural Sanitation; and in December, 1917, a Bureau of Life Extension

* *Ibid.*, page 133.

Work began with Dr. A. J. Ellington in charge.

This unit of Life Extension Work was carried to Vance, Alamance, Lenoir, and Robeson counties, and about 4,000 persons were given full

physical examinations. The work was favorably received, and the outlook was bright as far as continued development was concerned; however, it had to be discontinued when Dr. Ellington left to join the Army.

BUREAU OF COUNTY HEALTH WORK

The Bureau of County Health Work was organized July 1, 1917, through assistance from the International Health Commission of the Rockefeller Foundation which, in addition to detailing Dr. B. E. Washburn to inaugurate its activities, appropriated \$15,000 annually for county health work. This made it possible for the State Board of Health to meet the provisions of the Legislature which specified that the funds were to be expended in the proportion of 1 to 3. The work of the Bureau was to extend cooperation to ten counties on a three-year basis, the yearly budget for each to be \$6,100 for the first year. The program was to be limited to more important health problems with no attempt to cover the entire field of county health activity in a short period of time; but to demonstrate the benefits of public health by reducing the amount of sickness and by lowering the death-rate. The program was to be educational and progressive, and each county was to pay yearly an increased percentage of the expenditure: 50% the first year, 60% the second year, and 75% the third year. Each department was to be directed by a health officer; also there were to be a clerk and, during part of the program, two or more health inspectors, a dentist, a throat specialist, and a nurse; and provision was made for office equipment and supplies. Funds for the operation of these cooperative county departments were to be dispensed by the State Board of Health. The arrangement was for the county to send monthly, in advance, its budget allotment to the State Board of Health and expenditures would be paid by checks from the Bureau of County Health Work in

Raleigh.

The more important health problems of the county were to be covered with the following units: the prevention of soil pollution diseases; the quarantine of contagious diseases; school health work; life extension work; infant hygiene work; and health education.

This plan of county work enabled the State Board of Health to extend more than financial assistance. With the aid and advice of the cooperating county boards of health, it would direct and assume responsibility for the program. The health officers would be appointed by the State Board and work under its direction, and, through the Bureau of County Health Work, they would be supervised and kept in touch with each other. Each health officer would make monthly reports to the State Board and copies of his report would be sent to other departments and comparative reports would be sent monthly to the county officials so that they might compare the work in their county with that being done elsewhere.

From the standpoint of the health officer, the plan also had advantages. He would receive, through letters, visits, and conferences, the experience of others doing similar work and be graded by the results he obtained. As to the health officer's work, he was to educate the people regarding public health, and the test of his success was whether or not the people applied his teaching. "The State Board of Health desires and insists upon results. The method of obtaining these results would be left to the initiative of the health officer," declared Dr. Rankin.

THE BUREAU OF INFANT WELFARE

Mrs. Kate Brew Vaughan, an outstanding dietitian and cooking expert and an authority in home economics, came to the State Board in 1917 to assist in the educational program. Her particular work was in the field of infant welfare aimed at reducing the sickness and death-rates from infant diarrhea. With the assistance of Mrs. Vaughan, an Infant Hygiene Unit was made part of the program in each of the ten counties selected to cooperate with the Bureau of County Health work.

As planned, this unit was to be conducted in each county by a trained nurse working under the direction of the health officer; but because of the war in Europe, trained nurses were not obtainable, and the program had to be carried out in the counties by practical nurses, middle aged women selected for their ability and common sense. After a period of training with Mrs. Vaughan, these assistants conducted a program designed to instruct rural women in how to care for and feed their babies. A plan of teaching the women of each community in groups proved to be highly successful. In this undertaking, the practical nurses were assisted by the county health officer, by local doctors, and by home demonstration agents. Suitable literature and lecture demonstration material were supplied by the State Board of Health. When the women of a group had completed the course of eight weekly lectures and demonstrations and had passed an examination, each was given a certificate signed by the State Health Officer and by the Governor of North Carolina. This emergency unit, in the counties in which it was carried out, resulted in an early and marked reduction in the sickness and death-rates from infant diarrhea.

At the close of the War, the American Red Cross, which had done outstanding service at home and overseas, turned its attention to civilian nursing and offered to cooperate with state boards of health in infant hygiene work. In North Carolina, it agreed to contribute \$6,000 annually to finance a portion of the salaries of the nurses. However, the Red Cross insisted that the nurses be graduates of recognized nursing schools. None of the women then employed could qualify and neither could Mrs. Vaughan, although her work was outstanding and had attracted favorable attention throughout the South. More than this, nurses who could qualify were not to be found in North Carolina; so, in order to start work without delay, a group of nurses was brought in from outside the State as was also the supervising nurse. The plan of education for rural women was discarded; and Mrs. Vaughan resigned in September, 1919. The Bureau was then re-organized and enlarged to include public health nursing, the name of the new department being the Bureau of Public Health Nursing and Infant Welfare.

The result in North Carolina was that a useful emergency unit of educational work was disrupted. It was felt by the local authorities to be unfortunate that the new and recognized necessary standards could not have been introduced without destroying a unit of work which was accomplishing great good in the health education of rural women at a time of national emergency.

At the next Red Cross fund drive, however, only a relatively small percentage of expected contributions was collected; so poor, in fact, was the response that aid

to the State Board of Health was "abrogated" on February 1, 1922, to quote from a State Board of Health publication. When the American Red Cross abrogated the agreement existing since 1919 by which it jointly financed the Bureau of Public Health Nursing and Infant Hygiene, this Bureau was reorganized April 1, 1922 as the Bureau of Maternity and Infant Welfare with Dr. K. P. B. Bonner as Director; Miss Rose Ehrenfeldt remained as Supervisor of Nursing; and Mrs. T. W. Bickett was placed in charge of educational work.

When the Bureau of County Health Work was opened, three counties had already made appropriations for cooperative departments, and by the end of the year six more had made financial arrangements and been approved by the State Board of Health. The effects of the Great War made the conduct of rural health work difficult by causing a scarcity of labor and supplies and by increasing the cost of living. However, the results in the cooperating counties were so impressive, that the General Assembly of 1919 increased the appropriation for county health work from \$15,000 to \$27,500. They also broadened the law requiring medical inspection of school children and provided \$50,000 for the treatment of defective children. The enforcement of this law was placed under the Bureau of Medical Inspection of School Children, directed by Dr. G. M. Cooper. When fully organized, the personnel of this Bureau consisted of nine full-time dentists and six trained nurses. With this staff, it was planned to hold dental and throat clinics in all counties of the State once every three years.

This Bureau was established to carry out the medical inspection of school laws passed by the General Assembly of 1917. This law was one of the specific inaugural recom-

mendations of Governor T. W. Bickett. The Governor wrote the law himself, and to him belongs partly the credit for the establishment of medical inspection and treatment of school children in North Carolina.

The annual conferences sponsored by the International Health Board during 1917, 1918, and 1919 were attended by state and county health officers of the South. These were held in New Orleans, Atlanta, and Birmingham, and it was a matter of justifiable pride that North Carolina had far larger delegations at these meetings than any other state. Discussions were centered about the problems of rural sanitation and often on such questions as whether a health department should employ carpenters to construct privies, or as the health officers from North Carolina maintained, the families should be educated in public health so that they would build their own privies, the sanitary inspector being a teacher rather than a carpenter.

At these conferences, the county health officers were able to meet state and local health officials from all parts of the South as well as members of the United States Public Health Service. The most outstanding figure at these gatherings was Dr. Wickliffe Rose, Director of the International Health Board. Aside from his pleasing personality, the clarity with which he summed up each discussion made a deep impression upon the entire group of above 100 field directors and state health authorities. In fact, as was said about him "when he finished speaking there never seemed to be anything more that needed to be said." His declaration of the principles upon which the cooperative work of the Rockefeller Foundation was based gave a new conception of the importance of local programs and of how they should be conducted; and his earnestness made everyone feel sure that these principles of

conducting public health work were correct. Important among these was his statement that "the best method of teaching is by demonstration, and demonstrations in which the authorities do not participate to a substantial degree from the inception of the project are not likely to be successful". He also stated that the local agencies, through which the work is conducted, should be given credit for whatever is accomplished, and that the Rockefeller Foundation's part in the program had best not be publicized. Since the aim was to initiate health programs which were to become permanent, these should be conducted in such a manner as to induce the local government to take over the cost gradually, but steadily, and in a reasonable time assume the entire burden of their cost and direction. Finally, two statements which impressed the Conference were that a health worker should "always keep his eyes on objectives and not pay too much attention to incidentals" and "the speed at which you are going is not so important as being sure that you are going in the right direction."

The county health work movement was a direct outgrowth of the hookworm campaigns carried on from 1910 to 1915, and operation with the State Board of Health began in Wilson County during 1916 and by 1920 was fully developed.

The four outstanding results of this cooperative work carried on from July 1917 to the end of 1919 were: the increase in the number of counties providing full-time health officers or health departments — in this respect North Carolina led the nation; the progressive legislation enacted by the General Assembly during this period; the decrease in the death-rate from soil pollution diseases; and the recognition of the value of county health work by officials, businessmen, and people

in general.

Definite results may be summarized: (1) at the time of the organization of the Bureau of County Health Work in July, 1917, Wilson and Edgecombe were the only counties cooperating with the State Board of Health and the work in these counties was experimental in nature. By November 30, 1919, thirty months later the following fourteen counties were included in the cooperative plan of organized public health work, given in the order in which they joined the plan: Nash, Davidson, Wilson, Northhampton, Lenoir, Pitt, Robeson, Rowan, Forsyth, Edgecombe, Cumberland, Halifax, Surry, and Granville. In addition, the counties of Bertie, Vance, Beaufort, Union, and Harnett had made appropriations and asked for cooperation with the State Board of Health. Also, the following eight counties had full-time health officers or health departments conducted independently and without any cooperation or coordination with the State Board of Health: Buncombe, Cabarrus, Durham, Gaston, Guilford, New Hanover, Sampson, and Wake. Altogether, fully 45 per-cent of the population of North Carolina was being served by local health departments.

During these thirty months, there had been a marked decrease in the death-rates from the soil pollution diseases. In the early days of public health work, typhoid fever was so prevalent that the incidence of this disease was usually considered a fair index of the sanitation of a town or county, and a reduction in typhoid fever as a reduction in the number of deaths from all diseases which are spread through pollution of the soil. From 1914-1917, there occurred 478 deaths from typhoid in nine of the cooperating counties, which had a total population of 305,016; the average yearly number of deaths per county

was about 120 and the average yearly death-rate 35.3 per 100,000 people. Throughout the year 1918, in these nine counties there occurred only 24 deaths from typhoid — the average death-rate being 7.8 per 100,000 population. No case of the disease occurred during 1918 in either Davidson or Northhampton, two of the cooperating counties.

The State Board of Health, like other state agencies, was adversely affected by the Great War. Many health workers joined the armed forces, and those remaining at their posts were assigned extra duties. Dr. Rankin in his capacity as State Health Officer was made a member of a number of committees in connection with the Council of National Defense; and, as Chairman of the Committee of State Health Officers, he was called to Washington on a number of occasions for conferences in respect to preparedness measures. These included provisions for the control of venereal diseases in the civilian population; arrangements for coordinating the control of infectious diseases in the civilian population with their control in the cantonments; and to arrange as far as possible with the United States Public Health Service and the Surgeon General of the Army for preserving the personnel of state health departments. He also assisted Major John W. Long, Medical Aide to the Governor, in organizing the Medical Advisory Board, in interesting physicians to enter the medical service of the Army and Navy, and in inducing the remaining doctors of the State to become members of the Voluntary Medical Service Corps.

Partly due to these activities, the Surgeon General of the Army assigned Major Joseph J. Kinyoun to assist the State Board of Health in the control of communicable diseases. Dr. Kinyoun had been connected with the organization of the

State Laboratory of Hygiene, having taught Drs. Albert Anderson and W. T. Pate in the Government Laboratory in Washington in 1895 at the time the State Board of Health was planning to organize laboratory work. Dr. Kinyoun was a native of North Carolina, born in Davie County, and "one of the most distinguished students of epidemiology that America has produced." He graduated from Bellevue Hospital Medical College in 1882 and was appointed Assistant Surgeon in the Marine Hospital Service in 1886. Because of his interest in bacteriology, he was sent to Europe as a representative of the Service and worked with Koch in Berlin and with Pasteur, Roux, Calmette, Nocard, Verhoff, and Metchnikoff in Paris. He was the founder and first Director of the Hygienic Laboratory in Washington and had charge of the United States Quarantine Station at Angel Island, California, in May 1889, where he detected and quarantined cases of bubonic plague. With the coming of World War I, he was appointed Major in the Medical Reserve Corps, serving in North Carolina and South Carolina until December 6, 1918 when he was ordered for duty in the Surgeon General's office in Washington.

Dr. Kinyoun was born November 25, 1860 and died at his home in Washington, D. C. February 14, 1919.

The passage by Congress of the Kahn-Chamberlain bill, designed to bring about more effective control of venereal diseases, made available to North Carolina, and without condition, \$23,988.61 for venereal disease control. To direct this campaign, a Bureau of Venereal Diseases was organized with Dr. James A. Keiger as Director.

Between October 1, 1918 and March 1, 1919, North Carolina was visited by a state-wide epidemic of

influenza; this proved to be the worst scourge that had ever visited the State. About 20 per cent of the entire population contracting the disease, with 13,703 deaths. The ten counties cooperating with the State Board of Health suffered severely from the disease and had 1,630 deaths. The State Board of Health gave its entire time to the work of community organization which proved to be successful as a means of relieving suffering. Emergency hospitals were established in many places and conducted by volunteer day nurses; soup kitchens were set up where the victims were fed; and precautions against the spreading of oral and nasal secretions were enforced.

Because the health departments took the lead in relief work, the situation was better handled in the cooperating counties than elsewhere, and the work of the health officers and the State Board of Health was favorably commented upon by the press.

The General Assembly of 1919 recognized the importance of the work directed by the State Board of Health by passing legislation: (1) to prevent the spread of diseases from insanitary privies; (2) to provide for the physical examination and treatment of school children at regular intervals; (3) to prevent the spread of venereal diseases and to obtain reports of persons infected with these diseases; (4) for the repression of prostitutes; (5) to require the provision of adequate sanitary equipment for public schools; and (6) amended the laws relating to the abatement of certain nuisances.

The sanitary privy law provided that all privies except those of farmers and their tenants that are within 300 yards (fly range) of another home shall be constructed and maintained in a sanitary manner according to rules and regulations

prescribed by the State Board of Health. Provision was made for enforcing this law and also for the regular inspection of privies from two to six times per year.

Due to conditions brought about by the return of the nation to civilian life, an unusual number of changes occurred in the personnel of the State Board of Health. Miss Kate Herring, (later Mrs. J. H. Highsmith), who had charge of the publication of the *Health Bulletin* and other health literature, resigned to return to Federal service and was succeeded by Mr. R. B. Wilson who had been a former member of the department.

On August 1, Dr. A. McR. Crouch, Director of the Bureau of Epidemiology resigned to accept a position with the city of Wilmington. He was succeeded as Director of the Bureau by Dr. F. M. Register, Health Officer of Northhampton County.

In September, Dr. J. R. Gordon, Director of the Bureau of Vital Statistics, resigned because of ill health. On October 1, the Bureau of Epidemiology and the Bureau of Vital Statistics were combined under the direction of Dr. Register.

Dr. J. A. Keiger, on October 1, resigned as Director of the Bureau of Venereal Diseases and was succeeded by Dr. Millard Knowlton of the Public Health Service.

Funds for the support of the State Board of Health for 1919 were \$198,549.14 of which \$102,301.98 was from state appropriations and the remainder from outside sources. The State Laboratory of Hygiene received \$28,500 from the State and collected in fees, for special work, for the sale of antitoxin and in water taxes, a total of \$14,344.02, making a grand total of \$42,844.02 available for the work of the Laboratory.

In January, 1920, the United States Public Health Service and

the International Health Board cooperated in work to demonstrate the possibilities and advantages of malaria eradication in certain towns in eastern North Carolina. The International Health Board and the State Board of Health paid one-half the cost of the local work while the town in which the demonstration was carried out paid the other half; the supervising personnel was to be provided by the Public Health Service.

Malaria demonstrations were begun in 1920 in the towns of Goldsboro, Greenville, and Farmville, their budgets amounting to \$27,670.98. Mr. W. H. Funchs, Associate Sanitary Engineer of the Public Health Service, had supervision of the work. In connection with this anti-malarial work, during the spring of 1920 the North Carolina Land Owners Association, led by Mr. W. A. McGirt of Wilmington started an intensive educational campaign through the schools of thirty-eight counties. Prizes were offered for the best essays by children and 75,000 malarial catechisms, prepared by Dr. H. R. Carter of the Public Health Service, were distributed. The campaign was considered to be one of the most successful public health educational campaigns undertaken in the State.

To further carry on the work of malaria control, in 1923, the International Health Board was requested and agreed to participate in extending the program. Dr. H. A. Taylor, who had had experience in malaria control with the United States Public Health Service as well as with the Rockefeller Foundation, was assigned to direct the work. Pamlico County was selected for the program; the County and the State Board of Health each contributed 40 per cent of the cost, and the International Health Board paid 20 per cent in addition to Dr. Taylor's salary.

An important change was inaugurated in state health administration during 1921. This was the adoption of a cost basis for standardizing and measuring the efficiency of public health work in the counties in which the State participated financially. Under this plan, the county health department received from the state health department definite amounts for definite items of work; for example, \$7.50 for every child operated on for tonsils and adenoids; \$1.00 for each typhoid vaccination; instead of paying definite salaries the Board paid for the work done. However, this plan was found to be unsatisfactory to the county authorities since it meant that varying uncertain amounts would be received from the Board. Also, it was unsatisfactory to the health officers and nurses and other health workers whose salaries might vary because of weather conditions and holidays. This cost plan was soon abandoned, and a later report of the State Board states: "It is apparently at least one of the first attempts to introduce the cost system of industry into government."

An important bill enacted into law in 1921 required the physical examination of all applicants for marriage, making the issuance of a marriage license contingent upon the physical qualification of each applicant.

The General Assembly of 1921 also amended the act restricting the salary of the state health officer to \$3,000 per year so as to increase the salary to \$5,000. This salary item had remained the same since the election of Dr. Rankin to the position in 1909. On a number of occasions, particularly in 1919, the Joint Legislative Committee on Public Health had considered increasing the health officer's salary, but Dr. Rankin had objected for fear it would jeopardize the passage of

requests from the State Board of Health.

The various activities of the State Board of Health as they related to county authorities was the subject of discussion and criticism at the 1921 conjoint session of the Board with the State Medical Society. This criticism caused Dr. Rankin to review the policies of the Board. First, were problems which were administratively impossible for county governments to carry out; these included the protection of public water supplies; the control of communicable diseases; the collection of vital statistics; and, because the State assumed responsibility for education, the medical inspection of schools.

Second, policies economically impossible to county governments — these included public health education and laboratory work.

Third, policies relating to certain diseases and conditions which were of major importance to the State's death-rate. Tuberculosis was the most important of such diseases since its control included the location of patients and the treatment of a limited number of cases to establish standards of diagnosis and treatment. Also, included were methods for the control of venereal diseases, infant and maternity hygiene, and the State Board's privy policy.

In addition, Dr. Rankin stated that there were policies involving mutual interest and joint action with county governments. In these the state assisted financially through the help of the United States Public Health Service and the International Health Board.

Early in 1923, Dr. W. S. Rankin was invited by the "Committee of Municipal Health Department Practices" of the American Public Health Association to become Field

Director in making a study of municipal health procedures. The object of this study was to work out a set of principles through which city health departments could be classified and to assist such departments in their organizational work. The Executive Committee of the State Board of Health granted the Secretary a year's leave of absence, and on November 1, Dr. Rankin assumed his duties and established official headquarters in New York City. He continued this work until November 1, 1924.

A number of changes were made in 1923 in the organization of the State Board of Health as well as in its personnel. On March 1, Dr. Cooper made Assistant Secretary and became official head of the staff. If it had not been for his almost total deafness, he undoubtedly would have been selected to succeed Dr. Rankin when the latter resigned a short time later. Dr. J. M. Mitchener was assigned to head the Bureau of Medical Inspection of School Children after the Bureau of Epidemiology, which he had directed, was combined with the Bureau of Vital Statistics. However, Dr. Mitchener resigned from the Board in June and was succeeded by Dr. Roy C. Mitchell; and Dr. K. E. Miller, Director of the Bureau of County Health Work, was recalled by the United States Public Health Service.

Dr. Cooper, reporting to the Conjoint Session of the State Board of Health and the State Medical Society, held in Raleigh on April 16, 1924, stated that 30 counties now cooperated with the State Board in organized health departments. In addition, three other counties were doing satisfactory work on their own initiative; these thirty three counties contained 48 per cent of the States's population. In addition to these, seven counties

also cooperated in malaria control. The total cost of this county health work was nearly a half million dollars annually of which \$75,000 was being contributed by the State Board of Health on a cooperative basis. These cooperating counties were showing a greater reduction in death-rates than the State as a whole. The North Carolina death-rate for 1923 of 11.5 was a reduction of nearly 50 per cent during the past twelve years, or a saving of nearly 20,000 lives in one year. As an example, deaths from typhoid in 1923 were less than 275 for the first time. Pellegra caused 221 deaths, while in 1922 there had been 306 deaths.

The State Laboratory of Hygiene showed a general increase in all lines of work. There was improvement in facilities for making vaccines and antitoxins, especially diphtheria antitoxin. The entire work of the Laboratory was financed by approximately the same sum which it would take to buy the diphtheria antitoxin it distributed, and the Laboratory was preparing to distribute tetanus antitoxin at an early date.

Due to an increased demand from the people, the State Board of Health in 1923 adopted measures to improve the quality of public milk supplies by improving the sanitary condition of dairies and in the handling of milk. The plan put into effect had the following advantages: (1) it stabilized the milk industry; (2) allowed the State Board of Health to assist in organizing milk work; (3) milk grades did not vary from city to city - Grade A or Grade B would be the same in all cities of the State with the standard ordinance; (4) cities and towns that desired the State to check their system of dairy inspection and laboratory technique could receive such service. Those with accepted standards would be published,

which, in a sense, was a state certification that their milk supply was acceptable.

Another important phase of work inaugurated during 1924 was the county system of control over midwives which required them to obtain permits from the county health department before attending cases. The permit was granted only to midwives who had instruction from the health officer or a county nurse. Permits had to be renewed yearly. The law required the midwife to report to the county health department every case of pregnancy that consulted her prior to labor; also to notify the nearest physician in case of any complication. Cases reported to the health department were to be visited by the health officer or a nurse to ascertain if the woman was a safe risk for midwife care.

At the Conjoint Session of the State Board of Health and State Medical Society held in Pinehurst on April 29, 1925, Dr. Rankin announced his resignation as State Health Officer, effective June 1, to accept directorship of the Hospital and Orphan Division of the newly created Duke Endowment. On May 30, at the meeting of the Executive Committee of the Board, Dr. G. M. Cooper was unanimously made Assistant Secretary for an indefinite period of time.

After announcing his resignation, Dr. Rankin addressed "a final word" to the Society, saying, in part, "Opportunity for service, the greatest blessing that can come to man, you gentlemen of the Board and of the Society have given to me as you in all probability never gave another. Exceptional opportunity for service you have given me in most generous measure. But more than this, you have helped me to use it. You have helped in two ways: in one way with your unselfishness and confidence,

and in another way with your interest, support, and encouragement. By your consent and approval, I have for 16 years occupied one of the most strategic positions for real and lasting service which any man in this great State with its two and three-quarters million of people may occupy. The position of State Health Officer is nearer those causes that influence the fluctuation of our death-rate than any other position."

Resolutions passed by the State Medical Society in regard to the resignation of Dr. Rankin contain the following: "In spite of the fact that his public health policies have been largely of the pioneer type, he has made but few mistakes, which have been mistakes of good intention — and his achievements have been so outstanding as to attract the attention of scientists throughout the world."

After leaving the State Board of Health, Dr. Rankin headed the Hospital Program of The Duke Endowment. Of this program, Dr. W. C. Davison, Dean (retired) of the School of Medicine of Duke University, has said: "This program developed by Dr. Rankin is the model followed by the Hill-Burton bill. Rising hospital costs would have handicapped hospitals all over the Country if it had not been for the Blue Cross Program which Dr. Rankin fathered. With the help of Dr. Rankin and The Duke Endowment, the program grew into Hospital Care and Hospital Saving Associations which are models of Blue Cross plans in other states."

Dr. Davidson also relates: "In 1926, a former President of the American Medical Association advocated the establishment of a series of second rate medical schools throughout the Country. Dr. Rankin promptly invited him to tour North and South Carolina in order

to show him that good medical care is just as necessary for rural areas as for cities and that it was being provided with the aid of community hospitals which attracted keen medical graduates to small towns."*

When Dr. Rankin retired in 1950, after 25 years of service with The Duke Endowment, he had administered more than twenty million dollars for hospitals and for orphan care; and he still is active as a consultant. Marshall I. Pickens, who succeeded him as Director, says Dr. Rankin "has contributed more to the health of North Carolina than any man in his generation."

During his public health career, Dr. Rankin had been President of the American Public Health Association; Trustee of the American Hospital Association; first Chairman of the Charlotte Board of Health; Member of the North Carolina Medical Care Commission; Trustee of Wake Forest College; and he received honorary degrees from Duke University, University of North Carolina, Davidson College, and Wake Forest College. He also received, in 1956, the Distinguished Citizenship Award from the North Carolina Citizens Association.

When Dr. Rankin received the honorary degree of Doctor of Science from the University of North Carolina, he was cited as "an evangelist of good health who preached in season and out the need for better rural sanitation, for school health programs, for sanitary supervision of hotels and restaurants, and the creation of effective agencies for health betterment."

The City of Charlotte named their new public health building the "W. S. Rankin Health Center" and

*"Dr. Watson S. Rankin," by W. C. Davison, M. D., in the *North Carolina Medical Journal* of February, 1960.

this was dedicated on Dr. Rankin's 81st birthday, January 18, 1960. On the same date, Dr. Rankin was honored with a testimonial dinner. An editorial in the *North Carolina Medical Journal* for January, 1960

sums up Dr. Rankin's career as follows: "Few North Carolina doctors have had as distinguished a career as he, or have rendered greater service to mankind."

RESUME'

Intensive county work was the outstanding development in public health in the United States during the first two decades of the twentieth century. North Carolina was the leader in the organization of these county departments which resulted from the hookworm campaigns conducted from 1909 - 1914 in the Southern United States. These campaigns were of an educational nature and were followed by a number of community demonstrations directed against hookworm disease and soil pollution; which proved conclusively that as small a governing body as a county can deal effectively with its health problems and get results.

The success attained in North Carolina in this early public health work was due in large measure to the ability and ingenuity of the leaders who directed the activities of the State Board of Health. The first full-time State Health Officer, Dr. Watson S. Rankin, had been Dean of the School of Medicine of Wake Forest College before he came to the State Board of Health in 1909. Having been a teacher, he conducted the activities of the Board from an educational standpoint, the aim being to educate the people in disease prevention. North Carolina, as a result, became a leader in all phases of public health work, and this position was recognized throughout the South and the Nation.

The hookworm campaigns, being essentially a demonstration in the prevention of the prevalent soil pollution diseases, were recognized by Dr. Rankin as a great educational movement. This led him to give full support to the Rockefeller Sanitary Commission, directed in North Carolina by Dr. John A. Ferrell, who, while Director of the North Carolina Hookworm Commission and later

Assistant Director of the International Health Board of the Rockefeller Foundation, by careful organization, wise direction, and much hard work, made the campaigns and the community demonstrations far more successful than in any other Southern state. In North Carolina the demonstrations were conducted in all of the State's 100 counties. This success created among the people a desire and demand for more public health work, and a number of the larger and more progressive counties made provision for full-time county health officers to continue the fight against the soil pollution diseases.

Along with the inauguration of county health departments in North Carolina, there took place simultaneously other developments which had an important influence upon the advancement of local health work; mention has been made of the effective program of medical inspection of school children and of the treatment of defective children carried out by Dr. G. M. Cooper; and of health education directed by Mr. Warren H. Booker. The Laboratory of Hygiene, organized in 1908 by Dr. Clarence A. Shore, played a large role by providing vaccines and antitoxins for county health officers; diphtheria and tetanus antitoxin were made available at nominal costs to all who were in need of them and smallpox and typhoid vaccines were furnished free of cost. Also, the Laboratory was instrumental in the control of rabies and in improving public water supplies, in addition to diagnostic procedures carried out for the doctors of the State. The Bureau of Vital Statistics, organized by Dr. J. R. Gordon and later directed by Dr. F. M. Register, supplied information which enabled county

authorities to estimate and scientifically plan improvements in the effectiveness of their local program.

Of great importance to county health work was the development of the State tuberculosis program by Drs. L. B. McBrayer and P. P. McCain. These leaders were active in arousing the legislature, the counties, and the people in the fight against the disease which was one of the State's leading causes of death. Of direct help to county health officers was an intensive course in chest diagnosis given for their benefit at the State Sanatorium. Dr. McBrayer, as long as he lived, was an active director of the work of

the American Tuberculosis Association in North Carolina, and, upon his death, these activities were continued and extended by Dr. McCain. As would be expected, the result was a marked decrease in the morbidity and mortality rates of tuberculosis.

It is pleasing to note that North Carolina is maintaining its lead in public health work and that its State Board of Health continues to be one of the most progressive in the United States. In regard to county health work, all the 100 counties of the State now have, and have had since July 1, 1949 full-time county health department service.

APPENDICES

APPENDIX A

THE EARLY DEVELOPMENT OF COUNTY HEALTH DEPARTMENTS

The Rockefeller Sanitary Commission was formed to direct the expenditure of the gift of one million dollars made by John D. Rockefeller in 1909 to combat hookworm disease in the Southern United States. In carrying out the terms of the gift, cooperation was given through local organizations in ten Southern States; and, in 1913, an International Health Commission extended the control of hookworm disease to foreign countries. This Commission also continued the work of the Rockefeller Sanitary Commission in the Southern United States and gradually expanded its scope to embrace other public health problems. In 1916, the International Health Commission became the International Health Board, and the reports of this organization relate the successive stages through which local programs of health work developed into full time health departments.

During its first two years, the work of the Rockefeller Sanitary Commission was essentially educational; teaching the medical profession and the people how to control hookworm and other soil pollution diseases. The second stage was to assist rural communities in protecting themselves against these diseases, while the third stage was devoted to the organization of county health departments with full time personnel to make permanent the work already done and to deal with other public health problems. The first rural health departments, beginning with Guilford 1911 and Robeson 1912, were financed entirely by the counties, and counties have continued to be the principal source of their support. However, the State has gradually extended participation, being assisted by outside agencies; mainly the

Rockefeller Foundation and the United States Public Health Service.

The earliest record of a county appropriation for full time public health work is from Jefferson County, Kentucky during the year 1908.* It is not clear what part of the appropriation, if any, came from the city of Louisville which is located in the County; nor is it recorded whether this became a permanent health organization. In June 1911, Guilford County, North Carolina and in July Yakima County, Washington organized county health departments which have continued in operation without interruption since their establishment. Guilford was the first North Carolina County to employ a health officer for his full time; here Dr. G. F. Ross took office on June 1, 1911 and was paid a salary of \$2,500 per year which included all expenses. His work was mainly to combat hookworm disease and deal with other health problems in rural sections of the County. The city of Greensboro had a separate health department. In Yakima County, Washington, Dr. Thomas Tetreau was appointed health officer on July 1, 1911 to combat an epidemic of typhoid.

Robeson was the second North Carolina county to provide full-time health service when Dr. B. W. Page took up his duties on April 1, 1912, to continue the work against hookworm disease begun during the dispensary campaign. On July 1, 1913, Sampson County made provision for a full-time department with Dr. G. M. Cooper as Health Officer.

*Ferrell, John A. and Mead, Pauline A., *A History of County Health Organizations in the United States*, 1908-33, page 468.

However, previous to 1911, Dr. Thomas A. Mann was city Health Officer of Durham and Dr. Joseph Akerman of Wilmington; both on yearly salaries of \$1,500. In 1913, these city health departments were extended by legislative enactment so that Durham and New Hanover became full-time health department

counties.

By October, 1913, there were ten North Carolina counties with full-time health officers. These were: Buncombe, Columbus, Durham, Forsyth, Guilford, Johnston, New Hanover, Robeson, Rockingham, and Sampson.

APPENDIX B

THE NORTH CAROLINA PUBLIC HEALTH ASSOCIATION

At the State Medical Society meeting held in Asheville in 1909, a group of part-time county and town superintendents of health discussed the organization of a health officer's association. This was completed the next year, and the first regular meeting held in Charlotte in 1911 with Dr. L. B. McBrayer as Chairman. The declared purpose of the organization was "to bring into one organization the public health officers of the State of North Carolina so that by regular meetings and interchange of ideas they may secure more efficient cooperation and uniform enforcement of sanitary laws and regulations". Annual meetings of the organization were to be held at the same time and place as the meetings of the State Medical Society.

A review of the minutes of the Association for its early years, as published in the *Transactions of the State Medical Society*, gives an insight into the progress of public health in North Carolina with a record of the work of the county health officers, and of the yearly increase in the number and the efficiency of the local health departments.

At the first meeting, aside from regular business affairs, there was discussion in regard to the best type of privy for rural districts. Dr. C. W. Stiles of the Public Health Service was present and gave a talk on "The Practical Working of the Surface Privy." His conclusion: the surface privy is dangerous; he advocated the pail type of privy.

The second annual meeting was held at Hendersonville in 1912, Dr. McBrayer presiding. It was well attended. In addition to the superintendents of health, a number of

prominent members of the State Medical Society was present and took part in the proceedings, among these being Drs. J. A. Ferrell, W. S. Rankin, J. Howell Way, and also Dr. C. W. Stiles. There was an address by Dr. J. Y. Joyner, State Superintendent of Schools. The subject of Dr. McBrayer's presidential address was "The Health Officer." In closing he said: "If this organization shall make better, more efficient, more energetic health officers in North Carolina, if it shall thereby reduce the death-rate and the incidence of disease in our State and thus increase the productivity, the happiness and prosperity of our citizens, it will not have lived and wrought in vain. To that end let us ever strive."

An interesting feature of the meeting was the reports of the county superintendents of health. Outstanding among these was the report of Dr. Dan E. Sevier, of Buncombe County. In addition to carrying on the vaccination of school children against smallpox, 105 schools had been visited, and clean-up campaigns inaugurated. Many schools had built sanitary closets and were now getting water from wells instead of from springs. Each school building had been inspected and "recommended to be fumigated; but this had not been compiled with as the school committees were short of funds." The Asheville watershed had been inspected, and the West Asheville Board of Health had ordered hog pens removed to a reasonable distance from the streets. The dumping of garbage along public roads was forbidden.

A more typical report was from Wake County's superintendent of

health who reported that the jail had been cleaned, each prisoner had been provided with two suits of clothing costing \$1.25 per suit, and is required to have his hair clipped and take a bath at least once a week.

Dr. Stiles read a paper entitled "The Full-Time County Health Officer" in which he advocated that the county health officer should do health work only, with no treating of paupers or prisoners. He also advocated that a health department should have full-time employees but stated that it is not necessary to have local-born employees.

The theme of the third annual session held at Morehead City in 1913 was the health of school children. Dr. L. H. Glenn (of Gastonia), in his presidential address, outlined the problem of how to handle contagion in the school. Then Dr. A. S. Root made a report on the medical inspection of pupils in the Raleigh schools; and Dr. Stiles told of school inspection in Wilmington. Dr. Rankin discussed the new views regarding carriers of disease — scarlet fever, diphtheria, and smallpox are not airborne as was so long thought. Terminal disinfection was described by Mr. W. H. Booker, who joined Dr. Rankin in stressing that fumigation is useless. The handling of school contagions was discussed by Dr. Cooper. "The only way is to send the sick child home and keep him there until he is well. This applies alike to (the children of) Banker Jones and Plain John Smith."

In his presidential address at the fourth annual meeting held in Raleigh in 1914, Dr. Cooper called attention to the growing need in North Carolina for health officers. He told of the establishment of a department of public health in a medical school in Richmond and advocated a chair of Applied Hy-

giene and Rural Sanitation at the University of North Carolina. He also expressed the opinion that the medical inspection of schools is the best way to teach public health and sanitation. "When the day arrives when we have the same confidence of the public in preventive work as they now have in fumigation, the millenium will be here as regards health work."

Dr. Nesbit of New Hanover stated his belief that the school should be an example as regards sanitation of what a well-kept home should be. The school should have impressive objects of sanitation — sanitary privies, individual drinking cups, disposal of waste, means of washing the hands, and good drinking water. Negroes, he had found, are more cooperative than whites to health laws. All Negro schools should be visited.

At the fifth annual session held in Greensboro in 1915, it was announced that the International Health Commission had given tentative approval of the pit type of privy. Members of the United States Public Health Service disapproved. Dr. L. L. Lumsden, who attended the meeting in place of Dr. Stiles, stated that within 5 or 6 years there would be no doubt of contamination anywhere. Dr. Cooper replied, "We will wait 5 or 6 or 7 years."

This approval of the pit type of privy followed several years of animated discussions at health meetings and among health workers. Members of the Public Health Service led by Dr. Stiles strongly condemned the pit privy as dangerous in the spread of typhoid and other intestinal diseases. However, the bucket type of closet which they recommended was costly to build, difficult to keep clean, and but few people would build them and still fewer would maintain them.

In explaining the new quarantine law recently passed by the General Assembly, Dr. Rankin stated that about 10,000 cases of four infectious diseases — measles, whooping cough, scarlet fever, and diphtheria — occur in North Carolina each year causing about 1000 deaths. The State had enacted a law for their control, but its enforcement is too big a job for the State alone; it is delegated to the counties. In this connection, he again declared that disinfection and fumigation are useless and advocated thorough cleaning of rooms and objects which had come in contact with the patient.

The seventh annual meeting held in Asheville in 1917 was well attended, members from all parts of the State being present. In addition, there were members of boards of county commissioners, county boards of education, mayors, and members of town boards. All such officials were made eligible for membership. The program was of a practical nature. The quarantine law was discussed along with difficulties of its enforcement, and the new law providing for the medical inspection of school children was explained. The bill for this law in the general assembly was drawn by Governor Bickett himself, showing that public health had become a prime interest to State officials as well as to all classes of citizens.

An interesting feature of the meeting was the luncheon given to the Association at the Biltmore Dairy Farm, the dining tables being set in the milking barn, and at a time when milking was going on.*

The meetings of the State Medical Society and the Health Officers Association were held in Pinehurst in both 1918 and 1919. At the 1918 session of the State Medical Society, Dr. Joseph Goldberger of the United States Public Health Service read a paper en-

titled "A Preventive Treatment of Pellegra." This and the work of Dr. Goldberger were hailed with enthusiasm by the members of both societies. Dr. E. J. Wood, a member of the State Board of Health from Wilmington, said in discussing the paper, "I want to say on behalf of the whole State of North Carolina that the coming of Dr. Goldberger is not second even to the coming of Dr. Stiles to North Carolina in 1903 when he brought us the news of the hookworm. There is nothing that has ever happened in North Carolina that could be so far-reaching . . . for the everlasting upbringing of the State than what we have heard today."

The afternoon session of the Association was held at the Tuberculosis Sanatorium which is located only a few miles from Pinehurst. The papers discussed the results of the World War on the State's health work, especially the difficulty in obtaining health officers, nurses, and sanitarians; however, reports of accomplishments in reducing disease were promising, due often to the better cooperation of the people than ever before. This was particularly true in the reduction of typhoid fever from 839 deaths in 1914 to 502 in 1918.

The afternoon meeting of the 1919 session was held at the Eureka Farm-life School and the James McConnell Memorial Hospital in Carthage. The leading feature was an address by Mrs. Kate Brew Vaughan, Director of the Bureau of Infant Hygiene. In this she described conditions in the home which led to the high death-rate from infant diarrhea. These deaths can be prevented through cleanliness in the home and proper nutrition — the necessary changes in home conditions must be brought about

*Washburn, B. E., *As I Recall*, 1960, page

through education of the women of the country and the town. She outlined plans to be followed by her Bureau and asked the cooperation of all health workers and persons interested in public health. Mrs. Vaughan's address was greeted with "prolonged applause," and she was accorded a rising and unanimous vote of thanks.

Dr. Cooper, before reading his report as Secretary-Treasurer, asked if the Health Officer of Moore County was present. He was not. The same question was asked of Hoke, Lee, and Scotland Counties, and the same answer received. These are all counties near Pinehurst which is in Moore County. Dr. Cooper then called attention to the fact that the health officers from distant western counties such as Yancey, Mitchell, Buncombe, and Haywood were in attendance as well as from Carteret in the far east. He said, "I feel that the interest of the health officers of the Sandhill District toward this organization should be a little more than negative indifference, especially when I know that Lee County enjoys the distinction of having the second highest death-rate from typhoid fever in the State of North Carolina."

In advance of making his report as secretary-treasurer at the 1920 meeting held at Charlotte, Dr. Cooper called attention to the fact that the Association had been in existence for a decade; it was organized and held its first meeting in the old North Carolina Medical College in Charlotte on June 19, 1911. He stated that the progress North Carolina has made in public health work during these years was little short of marvelous. At that time there was not a single full-time county health officer in North Carolina. The nearest approach was Wilmington, which had just employed a physician for his full-time to enforce quarantine against small-

pox, there being an epidemic at that time. The chief occupation of every county and city physician was treating paupers, quarantining against smallpox, and deciding the best and cheapest method of fumigation. Smallpox vaccine was sold to county health departments at ten cents a tube, diphtheria antitoxin cost \$7.50 for 5,000 units. No such thing as typhoid vaccination had been discussed by the average physician at that time. The State Sanatorium for Tuberculosis was being bandied about from one bunch of politicians to another, with results which might have been expected. The average physician who did not treat at least fifty cases of typhoid each year with about five or more deaths was considered down and out. The State had never heard of the registration of births and deaths. The State Board of Health consisted of the secretary, his chief assistant, and a stenographer, and the work of Dr. Shore and one or two assistants in the State Laboratory of Hygiene. However, instead of retrospection, Dr. Cooper pleaded, health officers must map out new campaigns for the future because "there is an abundance of work to be done, and the public is by no means unanimous in its support of the efforts we are making."

An important feature of the 1920 session was an address by Dr. Charles V. Chapin, Health Officer of Providence, Rhode Island. In introducing Dr. Chapin, Dr. Rankin stated that "the theme of this meeting is Relative Values of Health Problems, and Dr. Chapin has given more thought to this question than any other man in the Country."

In his talk, Dr. Chapin stated that "one of the chief reasons health officers lack perspective in health work is that they do not take the trouble to think. Another is that it is too easy to be conservative. The health officer should be a

questioner rather than a knocker. Organizations may produce only red tape. Most public health measures do some good — the question is how much, and the next question is how much as compared with other things. What is the best expenditure of time and money in one community is not necessarily the best for all communities. As regards lines of work, the prevention of infant mortality is one of the most effective; school work is important and so is child welfare. The control of nuisances should be turned over to the police department and all complaints should be referred to them. Money should be spent on nurses and not on sanitary inspectors; this at least is true of Providence. Poor health and poor housing go together, but so do poor health and low wages." In closing, Dr. Chapin declared that "a plan of relative values should be drawn up as a tentative scheme for a definite place and time. It must be varried from time to time and from place to place."

The Health Officers Association during its ten years had become recognized as the most popular section of the State Medical Society. It constituted ten per cent of the total membership of the Society, and each year was attended by many of the influential doctors of the State as well as by educational leaders and by town and city officials. In order to give recognition to these, at the close of the 1920 session a resolution was adopted to change the name of the organization. At the 1921 meeting, a committee was appointed to revise the by-laws and constitution and change the name of the Association to the North Carolina Public Health Association.

By 1923, the Association had grown in membership and in influence. Its programs show the advances made in public health work as regards the adoption of new discoveries, and the technique

of their application. At the 11th session held in Pinehurst in 1922 and the 12th held in Winston-Salem, among the problems considered was the work of public health nurses with papers by members of the nursing staffs of the State and county departments. The programs included discussion of mentally defective children by Dr. C. Banks McNairy, the Superintendent of the Caswell Training School; an adequate county tuberculosis program by Dr. P. P. McCain of the Tuberculosis Sanatorium; protection of individual and municipal water supplies by Dr. J. H. Hamilton, of the New Hanover County Department and later Director of the State Laboratory of Hygiene; the relationship of public schools to the health department by Mr. S. B. Underwood, Superintendent of the Raleigh public schools; public health and public welfare, correlated in public health work by Mr. S. E. Leonard, Superintendent of Welfare of Wilson County. A most important paper was "The Value Received for Money Spent in Public Health Work as seen by a County Commissioner" by W. W. Dawson, Chairman of the Board of County Commissioners of Pitt County.

In his presidential address at the 1923 session, Dr. A. C. Bulla called attention to the 6,000 or more midwives in the State. "Only 2,500 are registered with the State Board of Health. Most of them are illiterate, and they attend one-third of all the births of the State. There are 2,300 doctors in the State; if these cannot take care of the births, and if the midwives cannot be eliminated, they should be educated."

In 1925, Dr. L. L. Williams, President of the Association, reported that there are 250 counties in 35 states of the United States with full-time health officers and health departments and that 35 of these are in North Carolina.

From its organization in 1910, the North Carolina Health Officers Association, later the North Carolina Public Health Association, has served a useful purpose. It has reviewed annually the problems of county health officers and superintendents of health and provided a forum through which these officials could keep abreast of advances

being made in preventive medicine. It also gives State and county officials an opportunity of meeting and knowing each other; and it gives the State Board of Health an opportunity to explain and discuss public health laws passed at each biennial session of the General Assembly.

APPENDIX C

THE NORTH CAROLINA STATE BOARD OF HEALTH

From its inception, the members of the State Board of Health have been selected, in part, by the State Medical Society and, in part, appointed by the Governor; this has tended to keep the Board free from party politics and has contributed to its success. Members have always kept abreast of the great discoveries being made in medicine and sanitation, and transmitted these discoveries to the physicians of the State and through them to the people. The Board advocated vaccination against smallpox; the use of antitoxin in the treatment and as a preventive of diphtheria; the disinfection of body dejecta to prevent the spread of typhoid and the bowel complaints of children; and the necessity of safe water supplies. Later they were leaders in providing hospitals for the treatment of tuberculosis and for the care of the insane.

The Board has always been interested in improving the requirements made for the practice of medicine. A Board of Medical Examiners had been created in 1859, and all persons going into practice in the State were subject to an examination by this Board. In 1893 they recommended that questions on hygiene be included in the examination of applicants for license.

At the General Assembly of 1901, a law creating a State Board of Embalming was enacted. Three members were to be from the State Board of Health and two to be practical embalmers.

In 1903, Dr. Lewis, Secretary of the State Board, assisted in preparing a bill at the request of the State Nurses Association requiring the registration of nurses. He also assisted in securing its passage.

This became effective January 1, 1904 and permitted the registration of nurses with the use of the title R. N. The Board of Nursing was organized to consist of two members to be selected by the State Medical Society and three trained nurses to be selected by the Nurses Association.

The North Carolina Board was the twelfth state board of health to be established in the United States. The reconstituted Board of Health in 1879 consisted of nine members: 3 appointed by the governor and 6 elected by the State Medical Society. In 1893, the General Assembly increased the governor's appointments to five members and decreased the State Medical Society's to four. Also, the term of office of all members was placed at six years. In 1931, the term of members was restricted to four years, but the non-political character of the Board was retained making it impossible for the Board to become a self-perpetuating organization. While eligibility standards for members have never been set by law, with the exception that one of the governor's appointments is to be an engineer, in later years custom has dictated that a dentist, a pharmacist, a dairyman and a veterinarian be among those appointed by the governor.

The president of the State Board of Health is elected from its members, and, as would be expected, the men thus selected have been leaders in the profession as well as prominent citizens of the State. Up until 1925, there were seven presidents. The first was Dr. S. S. Satchwell of Pender County. It was he who, at the annual meeting of the State Medical Society held in

Fayetteville in 1876, read a paper entitled, "State Medicine and Preventable Diseases," which resulted in the appointment of a committee to place the matter before the legislature.

Dr. Charles J. O'Hagan of Greenville, the second President of the State Board of Health (from 1881-82), was born in Ireland and a graduate of the University of Belfast. He settled in Greenville in 1850; after the Civil War, he studied medicine and practiced there until his death in 1900. Dr. O'Hagan was a strong advocate of having civic leaders of the State share the responsibility for the promotion of public health work. He was the grandfather of Dr. Charles O'Hagan Laughinghouse who was State Health Officer from 1926 to 1930.

Dr. Marcellus Whitehead of Salisbury was the third President, holding the position from 1882-83. He was President of the State Medical Society during 1873.

Dr. J. W. Jones of Wake Forest was elected to membership on the State Board of Health in 1883 and was instrumental in bringing about changes in the health laws which made the Board more efficient and in securing increased appropriations from the General Assembly of 1885. He was President of the Board from 1883 to 1889.

Dr. Henry T. Bahnson was born in 1845 in Lancaster, Pennsylvania; the son of a Moravian minister who moved to Salem, North Carolina in 1849. After service in the Confederate Army, he graduated in medicine at the University of Pennsylvania in 1867, then spent two years studying in Europe before settling in Salem where he soon became recognized as a leading practitioner and surgeon. He was a leader in the State Medical Society for fifty years and was President of the Society in 1887; also, he was a member of the

State Board of Medical Examiners from 1878 to 1884; of the State Board of Health from 1887 to 1895 and was President of the Board 1889-95. Dr. Bahnson was a leader in medicine, health, and civic affairs. Following his death in 1917 at the age of 72 years, the State Medical Society placed his portrait in the Hall of History in Raleigh.

Dr. George G. Thomas was born on July 14, 1848; the son of a doctor who practiced in Wilmington. After graduation in medicine from the University of Maryland in 1871, he also took up practice in Wilmington and led a busy and successful life. He helped establish the James Walker Memorial Hospital in 1876 and was, for years, one of its directors. He was a member of the State Quarantine Board and when the quarantine station at the mouth of the Cape Fear River was taken over by the Marine Hospital Service in 1895, he became its Director.

Dr. Thomas was elected to the State Board of Health in 1901 and made President of the Board in 1903, holding this position for eight years. Also, he was a member of the Board of Medical Examiners in 1890-94; and during the World War was appointed by Governor Bickett a member of the Medical Advisory Board for the Eastern District of North Carolina. Dr. Thomas died September 6, 1920.

Dr. Joseph Howell Way was born in Waco, Texas on November 20, 1865; but his parents moved to Waynesville, North Carolina when he was a small child. There he made his home until his death on September 22, 1927. He was educated at Vanderbilt University, graduating in 1886; and in his practice, he specialized in tuberculosis.

Dr. Way was a member of the State Medical Society for forty years and attended 36 of the annual

meetings, taking great interest in all affairs affecting the profession. So much was this the case that he was elected to every office in the gift of the Society; he was Secretary from 1902-1907; and was a delegate to the American Medical Association fourteen times. He was appointed to the State Board of Health in 1905 by Governor R. B. Glenn; reappointed in 1911 by Governor W. W. Kitchen; by Governor T. W. Bickett in 1917; and by Governor Cameron Morrison in 1923. Being elected President of the State Board of Health in 1911, he continued as such until his death, his service with the Board covering the important period of widespread development of public health work in North Carolina. In all this, he took an active part. In fact, in 1909, he was urged to take the position of full time State Health Officer but refused the post.

Aside from his work with the State Medical Society and the State Board of Health, Dr. Way was active in civic and educational affairs. He was a Trustee of Trinity College and Duke University from 1911 to 1927. During the First World War, he was commissioned Captain in 1917, Major in 1919, and later Lieutenant-Colonel and was in active service during 1917 to 1919. In 1921, he was Acting Surgeon-General in the United States Public Health Service.

Dr. Way was a fluent and effective speaker; quick to grasp the essential facts of any proposition — traits which made him outstanding in his professional life and in the development of the State Board of Health. His life and character were summarized at the time of his death by Dr. W. S. Rankin as follows: "Where others heard a sound, he heard a cause; where others debated, he decided; where others deliberated, he acted".

Aside from the presidents among outstanding members of the medical

profession who became members of the State Board of Health and may be mentioned are the following:

Dr. S. Westry Battle, 1901-1907, of Asheville, who was long recognized throughout the nation as an authority on the diagnosis and treatment of tuberculosis.

Dr. Albert Anderson, 1899-1901, of Wilson, who, after being trained in the Laboratory of the United States Marine Hospital Service, carried on work which later developed into the State Laboratory of Hygiene. For years he was the able Superintendent of the State Hospital for the Insane at Raleigh.

Dr. H. W. Lewis, 1899-1907, of Jackson, was called "the ideal physician" by Dr. (later Sir William) Osler on the occasion of Dr. Osler's visit to North Carolina to administer to Senator Matt Ransom.

Dr. C. J. O'H. Laughinghouse, 1911-1926, who in spite of his large practice was concerned with the larger community aspects of medicine. He was a leader in the establishment of the Caswell Training School for Feeble Minded Children; active in the campaign against hookworm disease; and interested in the development of full-time county health officers and departments. He took great interest in the establishment of East Carolina Teacher's Training School; now East Carolina College. He was appointed State Health Officer in 1926.

Dr. Edward Jenner Wood, 1878-1928, who, "though he lived only fifty years, contributed more to medical science and literature than any other man in our State during this generation."* This was a summary of his life given at the State Medical Society in 1929, the year following his death.

*Dr. J. G. Murphy, *Transactions of North Carolina Medical Society*, 1929.

Dr. Wood was born in Wilmington; the son of Dr. Thomas Fanning Wood, the Father of the State Board of Health. After graduating in medicine at the University of Pennsylvania in 1902 and a year of study in England, he returned to Wilmington to engage in practice. As a physician, Dr. Wood was conscientious to a fault, his chief obsession being thoroughness. He was a bacteriologist of the first rank, and long before his death his reputation and achievements were established and his name was respected in England as well as in America. He had three offers of professorships in medical schools, all of which were declined. When pellagra became prevalent in North and South Carolina during the early years of the century, Dr. Wood made a special study of the disease, even learning Italian in order to read about the disease in Italian medical journals. His study of sprue among soldiers returning from the First World War led to his spending a year at the London School of Tropical Medicine and Hygiene where he was awarded the degree of D. T. M. (Doctor of Tropical Medicine).

In recognition of his ability and especially of his work on sprue, Dr. Wood was elected a member of the American Association of Physicians, he being the first man in North Carolina to receive this honor.

The State Medical Society gave recognition of Dr. Wood by electing him President in 1910; he also served a term as a member of the State Board of Health from 1913 to 1919.

Dr. Cyrus Thompson, 1855-1930, was with little doubt the most popular and best liked member of the State Medical Society during the first half of the present century. He graduated from Tulane Medical School in 1878 but continued to be a scholar throughout his life — a student of literature, a student of

medicine, and a student of the times in which he lived.

He began to practice medicine in Onslow, his home county; but at the end of five years he abandoned medicine and taught school for two years. Then he gave his time to managing his farm. This was during the great financial crisis, and, to improve the condition of farmers, Dr. Thompson became active in the Farmers' Alliance. When the Alliance affiliated with the new political party, "The People's Party," he was nominated for the office of Secretary of State to which he was elected in 1897 and served until 1901. Already from his home county he had been state representative and senator as well as county commissioner and superintendent of health.

In 1904, Dr. Thompson took up the practice of medicine in Jacksonville. He at once joined the State Medical Society and in 1913 was elected to the State Board of Health of which he was a member for 18 years. In 1918, he was elected President of the State Medical Society.

Dr. Thompson was a many-sided man; aside from the practice of medicine, he was a successful teacher, a successful farmer, a successful politician, and always a successful statesman. After his return to medicine in 1904, he followed this with equal success during the remainder of his life. He became the ablest debater of his time and an orator of recognized ability. "Certainly North Carolina has not seen his like in this respect since the days of Governor Zeb Vance."*

Dr. James Lloyd Nicholson, the son of a Methodist minister, was

*Dr. L. B. McBrayer, *Transactions of State Medical Society*, 1931.

born in Duplin County on May 25, 1852 and died January 21, 1918. He graduated from the University College of Medicine in New York in 1875 and practiced most of his life in Onslow County where he did remarkable work in the upbuilding of his community and he exemplified to the fullest the influence a general practitioner can exert upon the life of his community. He joined the State Medical Society in 1880, and few, if any, doctors have wielded so great an influence upon the Society or the medical profession throughout the State. From 1897 to 1905 he was a member of the State Board of Health; from 1908 to 1914 a member of the State Board of Medical Examiners.

Dr. Nicholson may be classed as a medical missionary — not to some far away part of the world but to his own county and to North Carolina. He found time for many community activities; he stimulated scientific agriculture; he helped build better schools and roads and churches; he superintended Sunday Schools.

"He was one of the first in North Carolina to see the importance of hookworm disease both from a medical and an economic standpoint, and the wonderful medical missionary work begun by Dr. Nicholson did not remain confined to his own county. About 1908, we in New Hanover woke up to what this backwoodsman was doing and sent for him to come over and help us. He came gladly in spite of his dislike for public appearances. "The impression he made in Wilmington will be lasting." "He put us all to shame and never knew it. He thought he was learning much from us of new laboratory and clinical methods, while all the time he was teaching us the greatest lesson we ever learned."* Dr. Nicholson's activities were not confined to hookworm disease, but in every public health advance he was

an early devotee who applied promptly whatever there was of a preventive nature within the grasp of his people. His opinion was highly prized by his fellow physicians far and near for in addition to his knowledge of medicine, he had sound judgement and rare common sense.

The appointment of an engineer member of the State Board of Health was required by the act under which the Board was created in 1879 and proved to be a wise provision. Through the years, water and sewage were among important problems demanding the attention of the Board, and these engineer members rendered valuable service; in fact, they directed this phase of the Board's work, and usually without special compensation, until 1910 when an engineer was appointed to the Board's staff.

The first engineer member of the State Board of Health (from 1878-1883) was William Cain, CE from Charlotte who later became a professor at the University of North Carolina. He rendered a valuable contribution to early health work in the State by preparing a bulletin entitled, "Disinfection, Drainage, Drinking Water, and Disinfectants." This was published in a number of editions and later enlarged into a manual.

Colonel J. L. Ludlow, CE of Winston-Salem was appointed to the State Board of Health in 1888 and served by continued appointments until he resigned in 1922, after having been made an honorary member of the State Medical Society and of the North Carolina Health Officers Association.

At the conjoint session held in 1922 at which Colonel Ludlow

*Dr. E. J. Wood in *Transactions of State Medical Society*, 1918.

resigned, a resolution was passed expressing appreciation of his valued service as well as regret at his retirement. On this occasion, the President of the State Board of Health stated: "Coming to the Board in the year 1888 by appointment of His Excellency, Governor A. M. Scales, and serving continued appointments since from Governors Fowle, Aycock, Kitchen, and Craig, Colonel Ludlow has to his credit a period of service equaled in length — and surpassed by none in his due appreciation of the great and important responsibilities inherent in such membership, and his assiduity and intelligent zeal in discharging

the same."

The first chemist to become a member of the State Board was Dr. A. R. Ledoux, Ph.D., Professor of Chemistry at the University of North Carolina. He carried out the chemical analyses of water needed by the Board.

Dr. F. P. Venable, Professor of Chemistry and later President of the University of North Carolina, was a member of the Board from 1888 until 1897. He took part in work which later developed into the State Laboratory of Hygiene by assisting with the chemical examination of water.

APPENDIX D

THREE OUTSTANDING ORGANIZERS

Along with the founders of the State Board of Health, Drs. Thomas Fanning Wood and Richard Henry Lewis and Dr. W. S. Rankin, first full-time secretary, three doctors stand out in the development of public health work in North Carolina; Dr. John A. Ferrell, Director of the North Carolina Hookworm Commission, 1910-14, extended educational and treatment campaigns throughout the State and later directed work which hastened the advent of county health departments; Dr. Louis B. McBrayer who directed and developed activities which brought about the control of tuberculosis; and Dr. George Marion Cooper who may be called the "family physician" of the State because of his careful study of health and social ills and the modern methods he devised to alleviate them.

Dr. John Atkinson Ferrell was born in Clinton, Sampson County, December 14, 1880. He entered the University of North Carolina in 1898 and graduated with the B. S. Degree in 1902; his medical course was completed in 1907 at the University's Medical School at Raleigh; and the degree of Dr. Ph. was conferred upon him in 1919 by the Johns Hopkins School of Public Health.* Upon completing his medical course, he located in Kenansville and soon became the Superintendent of Health for Duplin County. In 1909, he was appointed Assistant Secretary of the State Board of Health for the Eradication of Hookworm Disease and took up his duties in Raleigh on February 1, 1910. In 1913, Dr. Ferrell was transferred to Washington as Assistant Administrative Secretary of the Rockefeller Sanitary Commission and subsequently to New York where he became Associate

Director of the International Health Commission of the Rockefeller Foundation. Later, he was placed in charge of cooperative public health work throughout the United States.

Upon his retirement from the Rockefeller Foundation in 1944, Dr. Ferrell served as the Medical Director of the Markle Foundation for two years; he then returned to North Carolina where he was appointed Executive Secretary of the Medical Care Commission on October 1, 1946. He, again, retired in 1957 after ten years of creative service with this Commission which was marked by the extensive development of hospital facilities and the erection of county health centers throughout the State. Since his final retirement, he has lived in Raleigh and is interested and takes part in the medical and public health organizations of the State.

Dr. Ferrell was so highly regarded by the members of the many professional organizations to which he belonged that he was elected to the following offices; Secretary of the North Carolina Medical Society, 1911-14; Chairman of the Section on Public Health of the American Medical Association, 1922-23; Chairman of the Malaria Commission of the Southern Medical Association, 1924; President of the American Public Health Association, 1933, and Chairman of its Executive Board from 1935-39; Honorary Fellow of the Royal Society of Health of London; Honorary Member of the Conference of State and Provincial Health Authorities of North America of which he was Field Secretary from 1937-44; and Honorary Member of the Canadian Public Health Association.

**Health Bulletin*, December, 1932.

The election of Dr. Ferrell as President of the American Public Health Association was a just recognition of the service he had contributed to the cause of public health throughout the United States, and it is interesting to note that he was the third North Carolinian to serve as President of the Association; the first was Dr. Richard H. Lewis; the other was Dr. W. S. Rankin, both being elected while holding the position of State Health Officer of North Carolina.

Dr. Lewis Burgin McBrayer was born in Buncombe County on December 27, 1868, and made his home in Asheville until 1914 when he became Superintendent of the Tuberculosis Sanatorium at Montrose. He received his medical degree from the Louisville Medical College in 1890 and was licensed to practice in North Carolina the following year. He soon acquired a general and surgical practice but was particularly interested in tuberculosis and public health. He served as health officer in Asheville from 1909 to 1914, devoting much time to improving the city's sanitation; giving special attention to water and milk supplies. His experience as health officer convinced him that North Carolina should provide a place where the poor and underprivileged with tuberculosis might go for care and treatment. As a result of this idea, he took an active part in including the Legislature of 1907 to provide the State Sanatorium. He continued as Superintendent of the Sanatorium until 1924 when he resigned because of failing health. He died at Montrose in April of 1938 and was ably succeeded by Dr. Paul P. McCain, his son-in-law.

When Dr. McBrayer went to the Sanatorium, the institution was in a deplorable condition — there was no resident director, and buildings and equipment were in need of repair.

More than this, the institution was burdened by a large debt. Dr. McBrayer, at once, took steps to fashion the Sanatorium into the superb institution it was destined to become under his management. He lived to see the establishment of an additional sanatorium in Western North Carolina, and he was instrumental in establishing public health nursing in the State. The Nurses Training School he organized at the Sanatorium was for both white and Negro nurses. He was on the commission appointed by the legislature to establish the Caswell Training School for Feeble-Minded Children and a member of its first Board of Directors. Dr. McBrayer was President of the Southern Tuberculosis Conference in 1925 and 1926.

Due to his unusual ability for leadership, Dr. McBrayer was a dominant factor in the medical life of North Carolina for nearly half a century. He joined the State Medical Society in 1900 and held every position of trust and responsibility in the gift of the Society. In 1908, he was elected to the State Board of Medical Examiners to serve until 1914; in this latter year, he was made President of the State Medical Society. Beginning in 1917, he served as Secretary-Treasurer of the State Medical Society until 1937. Upon his retirement, he was given a testimonial dinner at Winston-Salem on May 4, 1937. Dr. Paul Ringer presided as toastmaster and said, "Dr. McBrayer had few equals and no superiors. He must be classified as a great man when measured by whatever yardstick one may choose."

The resolution passed by the State Medical Society upon the death of Dr. McBrayer states: "He was a good physician, a fine health officer, an excellent Superintendent of the State Sanatorium, an enthusiastic leader in the Tuberculosis Association — in all these capacities, he

worked with determination to conquer tuberculosis and his pioneering labors in this field won for him and for his State nation-wide recognition."

Dr. George Marion Cooper was born in Sampson County on October 24, 1876. He was educated in public and private schools, and, in order that he might study medicine, he taught school from 1897 to 1901; then he entered the Medical College of Virginia, graduating in 1905. Immediately thereafter, he located in Clinton and did general practice, including surgery and obstetrics.

Dr. Cooper's experience as a private practitioner made him concerned about the prevalence of typhoid fever, tuberculosis, and the high infant mortality rate in his community and county. In 1909, he enlisted the interest of the mayor and the town board in cleaning up the town of Clinton and was the first physician of the State to use typhoid vaccine for mass immunization purposes. For twenty-one months thereafter, not a single case of typhoid fever developed in Clinton. The Sampson County Board of Health elected him Superintendent of Health on a part-time basis in May, 1911, however, his work was so effective that in 1913, he was made full-time County Health Officer of Sampson County.

Dr. Cooper's work in Sampson County resulted in his being appointed to the Staff of the State Board of Health on May 1, 1915, as head of the Bureau of Rural Sanitation. In 1917, he was placed in charge of school health work and in this position inaugurated a plan for providing dental work for children in the public schools. This program was popular among the patrons of the schools and so pleased the members of the dental profession that the State Dental Society made him an Honorary Member for life.

In 1919, he organized clinics for the removal of diseased tonsils and adenoids in school children; these clinics were conducted until 1931, and 23,211 children in 86 of the State's 100 counties were given operations.

On May 1, 1923, Dr. Cooper was appointed Assistant State Health Officer and was made Editor of the *Health Bulletin*. He continued as Editor of the *Bulletin* until 1942 and was Acting State Health Officer on four different occasions. In the reorganization plan of 1950, Dr. Cooper became Director of the Division of Personal Health which includes the following sections: Crippled Children, Nutrition, Cancer, and Heart Disease.

In 1949, Dr. Cooper received the Lasker Award of the Planned Parenthood Federation of America for outstanding service in maternal and child health and for his efforts in making North Carolina the first State in the Union to include birth control as part of its public health program.

In 1942, the University of North Carolina conferred the honorary degree of Doctor of Laws upon Dr. Cooper with the following citation: "George Marion Cooper of Sampson County, nationally distinguished as a public health officer, quiet and unassuming but relentlessly effective, has as a State health officer served for a longer period and in more fields than any other person. He has been a leader in practical programs for the medical care of the poor and has worked courageously to lift North Carolina from the disgrace of its high birth mortality of children and mothers. His work, pioneering in America, both for the improvement of the health of school children through free dental and tonsil clinics and for the improvement of the health of mothers and the birth of children, has become and

will continue to be an example to this and other nations and a benefaction to this and succeeding generations."

Dr. Cooper was elected to the following offices: President of the North Carolina Public Health Association, 1913; President of the Raleigh Academy of Medicine,

1934; President of the North Carolina Conference for Social Service in 1941; and first President of the North Carolina Academy of Public Health in December, 1942.

Dr. Cooper died on December 18, 1950, after completing thirty-five years of continuous work on the staff of the State Board of Health.*

**Health Bulletin*, January, 1955.

APPENDIX E

MEMBERS OF STATE BOARD OF HEALTH NORTH CAROLINA 1877-1964

1877-1931

	MEMBERS	HOME	APPT. BY GOV.	ELECTED BY SOCIETY
President 1889-95	Anderson, Thomas E.	Statesville	1899-1901	1905-31 Reorg.
	Anderson, Albert	Wilson		1909-13
	Ascraft, J. E.	Monroe		1877-88, 1889-95
	Bahnson, H. T.	Winston	1895-97	1891-93
	Baker, J. M.	Tarboro		1892-95, 1899-1905
	Baker, J. M.	Asheville		1907-13
	Battle, S. Westray	Greensboro		
	Beall, W. P.	Asheville		
	Burroughs, James A.			
	*Cain, William, CE.		1878-80, 1881-83	
President 1928-31	*Chase, John C., CE	Wilmington	1893-95, 1897-99	
	Crowell, A. J.	Charlotte	1919-31 Reorg.	
	Dodson, H. H.	Milton	1901-05	1899-1901
	Duffy, Charles Jr.,	New Bern		1877-78
	Duffy, Francis	New Bern		
	Foote, George A.	Warrenton		1877-82
	Graham, Joseph	Charlotte		1877-78
	Harrell, W. H.	Williamston		1893-97
	Harris, Fletcher R.	Henderson		1913-23
	Hilliard, William D.	Asheville		1885-91
	Hines, Peter E.	Raleigh		1887-78
	Hodges, J. A.	Fayetteville		1889-93
President 1883-89	Ivey, W. P.	Lenoir	1901-07	
	Jones, J. W.	Wake Forest		1883-89
	Kent, A. A.	Lenoir		1913-15
	Laughinghouse, D. O'Hagan	Greenville		1911-26
Sec. BOH 1926-30	*Ledeux, A. R., Chemist	Chapel Hill	1878-80	
	Lewis, H. W.	Jackson		1899-1907
	Lewis, R. H.	Raleigh	1892-1909	
	Lucas, W. H. G.	White Hall	1893-95	
	*Ludlow, J. L., CE		1888-97, 1901-13	
	Lumsden, W. J.	Elizabeth City	1895-97	
	Lytle, S. H.	Franklin	1881-85	
	McDaniel, L. E.	Jackson	1927-29-31-35	1927-29, 1929-31
	McDonald, James M.	Washington		Reorg.
	Nicholson, J. S.	Richlands		1883-89
Sec. BOH 1931-34	O'Hagan, Charles J.	Greenville	1878-82, 1897-1901	1897-99
	Orr, Charles C.	Asheville	1927-35 Reorg.	
	*Parrott, J. M.	Kinston	1930-31, 1931	
	Payne, R. L.	Lexington		1878-80
	Rankin, W. S.	Charlotte	1926-27	
	Register, E. C.	Charlotte		1907-13, 1917-25
	Satchwell, S. S.	Rocky Mount		1877-81 (Died 1881)
	*Shaffer, A. W. CE	Raleigh	1899-1901	
	*Simmons, W. G., Chemist	Wake Forest	1881-89	
	Spencer, W. O.	Winston	1905-17	
President 1877-81	Spicer, John D.	Goldsboro	1897-1899	
	Stanton, D. A.	High Point		1923-31 Reorg.
	*Stowe, J. P., Ph. G.			1922-31 Reorg.
	Taylor, David T.			1907-09
	Thomas, George G.	Wilmington	1901-05	1891-95-05-11
	Thompson, Cyrus	Jacksonville		1913-31 (Died 1930)
	*Tucker, E. J., D.D.S.	Roxboro	1923-31 Reorg.	
	Tucker, J. H.	Henderson	1885-93	
	Venable, F. P.	Chapel Hill	1889-1899	
	Waddell, Charles E.		1921-23 Resigned	
President 1911-28	Way, J. Howell	Waynesville	1905-29	
	Whitehead, W. H.	Rocky Mount		1901-05
	Whitehead, John	Salisbury		1893-97
	Whitehead, Marcellus	Salisbury		1878-84
	*Winslow, Arthur, CE	Raleigh	1883-89	
	Wood, Thomas F.	Wilmington		1877-92 (Died 1892)
	Wood, Edward J.	Wilmington	1913-19	
	Wooden, H. G.	Franklin	1878-80	
	Wright, John B.	Raleigh	1926-31 Reorg.	

MEMBERS	HOME	APPT. BY GOV.	ELECTED BY SOCIETY
Only Dr. Parrott carried over from old board			
*Baity, H. G. Ph.D.	Chapel Hill	1931-35, 1935-39 1939-43	
President 1964- Baker, Lenox, D.	Durham	1956-57, 1957-61 1961-65	
Bender, John R.	Winston-Salem		1949-53, 1965 +
Brian, Earl W.	Raleigh		1958-59, 1959-(Died 1960)
President 1958-63 Bugg, Charles R.	Raleigh		1957-61, 1961-63 (Died 1963)
President 1931-33 Burrus, John T.	High Point	1931-33	
President 1934-39 Craig, S. D.	Winston-Salem		1931-49
*Current, A. C., D.D.S.		1953-57	
Crump, G. Curtis		1955-59 (Resigned 1958)	
Dawsey, Ben W.		1959-63	
President 1949-58 Dixon, Grady C.	Ayden		1931-58 (Died 1958)
*Edwards, Z. L., D.D.S.		1957-61	
*Evans, L. B.	Windsor		1931-33
*Fordham, C. C., Ph.G.		1941-45	
*Goode, J. A., Ph.G.	Asheville	1931-33	
Goodwin, Dscar S.	Apex		1960-63
Haywood, Hubert B.	Raleigh	1937-41-45-49 1949-53-57 1954-55-59 1961-65	
Henderson, John P., Jr.		1949-52 Resigned 1952	
*Hooper, Glenn L., D.D.S.		1945-47-51, 1959-63	
*Hunt, Mrs. James B.		1931-33-37-41-45 (Died 1946)	
*Jackson, Jasper C., Ph.G.	Goldsboro	1946-49	
*Johnson, J. N., D.D.S.		1963-67	
*Jones, Paul E., D.D.S.	Chadbourn	1931-33-39-43-47	
*Koonce, Samuel G., Ph.G.	Rocky Mount	1951-55 (Died 1955)	
Large, H. L.		1953-57-61	
*Latta, Mrs. J. E.			1949-53-57
Lawrence, Ben J.			
Lutz, H. C., Ph.G.		1951-55-59	
*Moore, Larry L., Jr., B.S.		1943-45	
Nolan, J. D.		1946-49	
Morrison, Roger W.	Asheville		1957-59-63
Sec. BDH 1931-34 Parrott, J. M.			1930-31
Raper, James S.	Asheville		1964-
Rainey, W. T.	Fayetteville		1937-41-45-49
*Redfeam, D. T., B.S.	Wadesboro	1961-65	
President 1933-34 Reynolds, Carl V.	Asheville	Resigned 1934	1931-35
Sec. BDH 1934-48 Rhodes, John S.	Raleigh		1964-
*Scott, Mrs. W. Kerr		1961 Resigned 1961	
*Stowe, James P., Ph.G.	Charlotte	1933-37-41	
Ward, J. LaBruce	Asheville		1939-43-47-51
TOTAL 1877-1931 64			
1931-1964 40			
104			

*All other than physicians have occupation shown

SUBJECT INDEX

- Adenoid and Tonsil Clubs, 51
- Agriculture, N. C. Department of, 15, 32
- American Public Health Association, 36, 74
- American Red Cross, 66
- Appropriations from the General Assembly, 11, 33, 35, 41, 43, 44, 49, 55, 70
- Biennial Reports* to General Assembly, 1, 10, 15, 18, 28, 32
- Board of Medical Examiners, Established in 1859, 8
- Children's Bureau, Federal, 52
- Cholera Epidemic in Hamburg in 1892, 5
- Cost System of Aid to Counties, 71
- County Boards of Health, 14, 28
- County Health Departments, Early, 60, 79
- County Health Officers, 14
- County Health Work, Bureau of, 49, 63, 65
- Death Rate: 40, 42, 69
- Dental Clinics for School Children, 51
- Diphtheria,
 - Antitoxin, 40, 45, 73
- Duke Endowment, 73, 74
- Embalming, State Board of, 87
- Engineering and Education, Bureau of, 57
- Epidemiology, Bureau of, 63
- General Assembly, Acts of, 10, 24, 27, 28, 33, 34, 43, 55, 71
- Health Bulletin, 17, 57
- Health Conditions due to the Civil War, 8
- Health Conferences, 24
- Hill-Burton Act, 74
- Hookworm Campaigns, 33, 46, 76
- Infant Welfare, Bureau of, 66
- Infectious Diseases, Quarantinable, 25
- Influenza Epidemic of 1918, 70
- Laboratory of Hygiene, 33, 40, 44
- Life Extension Work, Unit of, 63
- Malaria, 6, 30, 71
- Massachusetts Sanitary Commission Report, 4
- Marine Hospital Service, 32
- Metropolitan Life Insurance Company, 56
- Marriage, Examinations Required, 71
- Midwives, 73, 85
- Milk, Public Supplies of, 73
- Metropolitan Value of Public Health Work, 41, 45
- Nash County Health Department, 60
- North Carolina Medical Journal*, 75
- North Carolina Public Health Association, 81
- Nurses, Registration of, 87
- Oral Hygiene, 51
- Organizers, Three Outstanding, 93
- Pasteur Treatment, 7
- Pellagra, 42
- Public Health Service, United States, 6, 52
- Quarantine, 20, 25
- Rabies, *See* Pasteur Treatment
- Resume of Public Health Work in North Carolina, 76
- Rockefeller Sanitary Commission, 1
- Rural Sanitation, Bureau of, 50
- "Sanitary Engineering" pamphlet by Professor Cain, 15
- Sanitary Surveys by Hookworm Commission, 47
- School Children, Bureau of Medical Inspection of, 51, 63
- School Children, Vaccination of, 23, 26
- Smallpox, 7, 23, 26, 42
 - Epidemic in Wilmington 1865, 9
- "Sources and Modes of Infection," by Chapin, 6
- State and Provincial Health Authorities, Conference of, 36
- State Board of Health
 - Petitions to General Assembly for Establishment of, 8
 - Act passed in 1877, 10
- Bureau or Departments of, 43
 - Composition of Board, 12, 35

- Duties of Board, 13
- Executive Department of, 52
- Expenditures of, 14
- National Recognition, 26
- Organization of, 2, 72, 87
- Publications, 14, 39
- Reorganization of 1879, 13
- Secretary to Carry out Provisions, 10
- State Medical Society, 8, 10, 12, 72
- Training Center for Health Officers, 52
- Tuberculosis, 21
- Tuberculosis, Association to Combat, 36
- Tuberculosis Sanatorium, 36, 54
- Typhoid Fever, 5, 32, 50
 - Epidemic at Greensboro State Normal and Industrial School, 31
- University of North Carolina:
 - Assists in Water Analysis, 32
 - Commencement of 1909, 1
 - Cooperation in Post-Graduate Medical Course, 52
 - Inspections by State Board of Health, 28
 - Proposed Training School of Public Health Workers, 53
- Vaccination, 13, 19
- Veneral Diseases, 69
- Vital Statistics, 15, 16
 - Bureau of, 40, 59
- Wilson County Demonstration Health Department, 61
- Yellow Fever, 6, 19
 - Epidemic in Wilmington in 1862, 8
 - Refugees, 19

INDEX OF NAMES OF PERSONS

- Akerman, Dr. Joseph, 80
 Alexander, Dr. A., 30
 Anderson, Dr. Albert, 32, 54, 69, 89
 Anderson, Dr. W. S., 26
 Aycock, Governor, 92
 Bahnsen, Dr. Henry T., 20, 30, 32, 88
 Battle, Dr. Kemp P. Jr., 36
 Battle, Dr. S. Westry, 21, 30, 89,
 Bellamy, Dr. Harlee, 42
 Bickett, Governor T. W., 67, 89
 Bickett, Mrs. T. W. 67
 Biggs, Dr. Herman M., 5
 Bonner, Dr. K. P. B., 67
 Booker, Warren H., 57, 76, 82
 Branch, Dr. Ernest A., 51
 Braswell, Dr. J. G., 63
 Brooks, Dr. J. E., 54
 Bulla, Dr. A. C., 85
 Cain, William E., 14, 15, 91
 Carter, Dr. Henry R., 6, 71
 Chadwick, Sir Edward, 2
 Chapin, Dr. Charles V., 6, 84
 Cochrane, Dr. Jerome, 20
 Coon, Charles L., 62
 Cooper, Dr. G. M., 50, 63, 67, 73
 76, 79, 95
 Cooper, Peter, 4
 Covington, Dr. P. W., 49
 Craig, Governor, 92
 Creech, Mr. Oxcarr, 60
 Crouch, Dr. A. McR., 63, 70
 Davison, Dr. W. C., 74
 Dawson, W. W., 85
 DeRossett, Dr. Moses John, 9
 Dickson, Dr. James H., 8
 Duffy, Dr. Charles, Jr., 11
 Duncan, Dr. W. H., 3
 Dunn, Dr. W. L., 54
 Ehrenfeldt, Miss Rose, 67
 Ellington, Dr. A. J., 64
 Faison, Hon. John M., 43
 Ferrell, Dr. John A., 1, 46, 76, 93
 Foote, Dr. George A., 10, 11, 14
 Fowle, Governor, 20
 Fuchs, W. H., 71
 Glenn, Dr. L. H., 82
 Goldberger, Dr. Joseph, 83
 Gordon, The Hon. Dr. J. R., 54, 59,
 70, 76, 89
 Grisson, Dr. Eugene, 10
 Hall, Dr. F. J., 8
 Hamilton, Dr. J. G. deR., 9
 Hamilton, Dr. J. H., 85
 Hays, Dr. B. H., 54
 Herring, Miss Kate, 70
 Hines, Dr. Peter E., 11
 Holt, Governor Thomas Michael, 24
 Jacocks, Dr. W. P., 48
 Jefferson, Thomas, 2
 Jones, Dr. J. W., 16, 88
 Joyner, Dr. J. Y., 39, 81
 Julian, Charles A., 54
 Keiger, Dr. James A., 69, 70
 Kendrick, Dr. John F., 44
 Kinyoun, Major Joseph J., 32, 69
 Kitchen, Governor W. W., 89
 Koch, Dr. Robert, 21, 31
 Laughinghouse, Dr. C. J. O'Hagan
 89
 Ledoux, Dr. A. R., PHD., 14, 15, 92
 Leonard, Mr. S. E., 85
 Lewis, Dr. H. W., 23, 89
 Lewis, Dr. Richard Henry, 1, 17, 20
 21, 24, 30, 35, 38, 54
 Lind, Dr. James, 2
 Long, Dr. Henry, 26
 Long, Major John W., 69
 Lucas, Senator, 24
 Ludlow, Col. J. L., 31, 33, 55, 58,
 91
 Lumsden, Dr. L. L., 82
 Mann, Dr. Thomas A., 80
 McBrayer, Dr. L. B., 55, 77, 81, 93,
 McCain, Dr. P. P., 77, 85
 McGirt, Mr. W. A., 71
 McIntosh, Dr. William A., 44
 McKee, Dr. W. H. 8
 McNairy, Dr. C. Banks, 85
 Miller, Mr. H. E., 58
 Miller, Dr. K. E., 52, 72
 Mitchell, Dr. Roy C., 72
 Mitchener, Dr. J. M., 72
 Murphy, Dr. J. G., 3, 89
 Murphy, Dr. Patrick L., 20
 Nesbitt, Dr. C. T., 82

- Nicholson, Dr. James, 34, 46, 90
 O'Hagan, Dr. Charles J., 10, 14, 88
 Osler, Dr. William, 89
 Page, Dr. B. W., 79
 Park, W. H., 5
 Parrott, Dr. J. M., 54
 Pate, Dr. W. T., 32, 69
 Payne, Dr. R. L., 10, 14, 15
 Pfeiffer, Dr. A. C., 63
 Pickens, Marshall I., 74
 Pittman, Dr. M. J., 10
 Pratt, Dr. Joseph H., 52
 Rankin, Dr. Watson Smith, 1, 34, 38, 46, 54, 72
 Ransom, Senator Matt, 89
 Reed, Dr. Walter, 6
 Reeves, Dr. B. E., 45
 Register, Dr. F. M., 59, 70, 76
 Rice, Dr. J. L., 62
 Ringer, Dr. Paul, 94
 Rockefeller, John D., 1, 46, 79
 Root, Dr. A. S., 82
 Rose, Dr. Wickliffe, 67
 Ross, Dr. G. F., 79
 Russell, Governor Daniel L., 30
 Russell, Dr. F. F., 7
 Sandwith, Miss Mabel, 56
 Satchell, Dr. S. S., 10, 11, 13, 87
 Scales, Governor A. M., 92
 Sevier, Dr. Dan E., 81
 Shattuck, Lemuel, 4
 Shore, Dr. C. A., 33, 44, 76
 Smillie, Dr. W. G., 63
 Simon, Sr. John, 2, 3
 Smith, Dr. Southwood, 3
 Smith, Dr. Stephen, 4
 Sternburg, Surgeon George M., 5
 Stevens, Dr. M. L., 54
 Stiles, Dr. C. W., 34, 46, 81
 Strode, Dr. G. K., 62
 Strudwich, Dr. Edmond, 8
 Taylor, Dr. H. A., 71
 Tayloe, Dr. Joshua, 26
 Tetreau, Dr. Thomas, 79
 Thomas, Dr. G. G., 30, 35, 54, 88
 Thompson, Dr. Cyrus, 90
 Underwood, Mr. S. B., 85
 Vance, Governor Z. B., 12, 90
 Vaughan, Mrs. Kate Brew, 66, 83
 Venable, Dr. F. P., 32, 37, 92
 Washburn, Dr. Benjamin E., 61, 63, 65
 Waterhouse, Dr. Benjamin, 2
 Way, Dr. J. Howell, 54, 88
 Welch, Dr. William H., 1, 5
 Whitehead, Dr. John, 30
 Whitehead, Dr. Marcellus, 10, 14, 88
 Wilbur, Dr. Creecy, 40
 Williams, Mrs. Florence, 56
 Williams, Dr. L. L., 85
 Wilson, Dr. Louis R., 53
 Wilson, R. B., 70
 Wood, Dr. E. J., 42, 89
 Wood, Miss Jane, 18
 Wood, Dr. Thomas Fanning, 1, 9, 11, 13, 20, 21, 36
 Woodfin, Dr. Henry G., 14
 Zimmerman, Jane, 11, 18, 44

3 3091 00614 9033

Date Due

[illegible]

BRODART, INC.

Cat. No. 23 233

Printed in U.S.A.

